

THE IRON AGE

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Contents — April 11, 1935

Uncle Sam as a Business Man.....	7
Steel Inspection Methods and Limitations.....	8
Reconditioning Pickling Solutions.....	10
Electric Aids to Precision Rolling of Steel.....	12
Will Change in Motive Power Revolutionize Railroads?...	16
Broadening the Distribution of Wealth.....	19
Late Returns from Laboratory and Mill.....	27
Design Assures Alinement of Chucking Machine Units....	30
Activities Bearing on Machine Tools Distribution.....	33
New Equipment	34
March Ingot Output	38
News	38
Personals and Obituaries.....	38C
Washington News	39
Automotive Industry	42
Statistics on Metal-Working Activity.....	46
Markets	47
Construction and Equipment Buying.....	74
Products Advertised	118
Index to Advertisers.....	140

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SILVERY MAYARI Pig Iron opens the way to the use of a high percentage of steel scrap in high-test castings, to keep the total carbon low, without incurring the troubles that usually go with this practice.

Using mixtures containing from 10 to 25 per cent Silvery Mayari, and 30 to 75 per cent steel scrap, foundrymen are readily obtaining

castings of high tensile strength, easy machinability, and uniformly high Brinell readings.

Silvery Mayari is a specially developed Mayari Pig Iron which introduces a balanced content of chromium, nickel, manganese and silicon into the cupola mixture. Its high silicon content offsets the quick freezing of the molten metal and precipitates sufficient graphitic carbon to make the casting easily

machinable. Silvery Mayari does away with the necessity of adding expensive alloys at ladle or spout.

In addition to simplifying foundry practice, Silvery Mayari gives to castings the properties for which Standard Mayari is so well known. Freedom from blowholes, spongy spots and other imperfections, even on thick sections. High resistance to heat and wear. Uniform Brinell readings throughout, on both thick and thin sections.

Silvery Mayari's low cost makes its wide use practicable. The simplicity of its application recommends it to all foundrymen. It is now being made to the following analysis: nickel, 1 per cent; chromium, 2 per cent; carbon, 2.5 per cent maximum; silicon, 9 to 12 per cent; manganese, 2 to 3 per cent; phosphorus, 0.10 per cent maximum.

Foundrymen are invited to consult Bethlehem foundry specialists, about Silvery Mayari and its use.



BETHLEHEM STEEL COMPANY

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▲▲▲ THE IRON AGE ▲▲▲

ESTABLISHED 1855

APRIL 11, 1935

Vol. 135, No. 15

Uncle Sam As a Business Man

THE Machinery and Allied Products Institute has recently made a survey covering the pent-up demand for capital equipment goods. It places this demand at an equivalent of \$18 billion, sufficient to absorb every unemployed worker in the machinery building industries into full-time employment for the next two years.

This pent-up demand represents actual needs. It is a measure of what those in charge of American manufacturing plants know should be done to bring their properties sufficiently up-to-date to insure profitable operation at going price levels.

Of course, if this demand were released, we could all sing "Happy Days Are Here Again," for the depression would be over, since the reemployment of 4 million, plus the secondary reemployment which would ensue from it, would take care of every present idle but able-bodied and willing worker.

Matching this demand, which is a real one even though caged at present, is a similarly caged or pent-up total of private investment funds and credit which could finance these requirements with ease. And private investors, who control these funds, are as anxious to put them to work as our plant managers are to put better profit-making machines to work.

Why, then, the impasse?

It is not because investors lack confidence in business management, nor because business management lacks courage to go ahead. It is because the investor, day by day, is confronted with developments which destroy his confidence in Uncle Sam as a business man. And investors know that no matter how good private business management may be, it cannot succeed if Uncle Sam's management of the biggest business of all continues to be as it is now and has been for the past several years.

The man who through thrift has saved money and therefore has it to invest cannot reconcile himself to the doctrine of dissipation of assets or to the deliberate depreciation of equities. He cannot reconcile himself to unplanned spending for spending's sake, nor to the appointment of overgrown but inexperienced college boys to manage the handout of billions in visionary schemes which include, as in New York, the making of "boondoggles" and the teaching of eurythmic dancing to the unemployed.

J. H. Van Doren

Steel Inspection

Methods

And Their

Limitations

° ° °

By W. E. JOMINY

*Metallurgical Section of Research
Division, General Motors Corpn.*

° ° °

THE author states that present methods of testing certain types of steel are inadequate and therefore new testing methods are badly needed. He discusses herewith steel inspection tests commonly used as well as others not so common. He also describes methods of examining steel intended for automotive applications, including bars for ring gears and flat leaf chassis springs and wire for coil springs.

° ° °



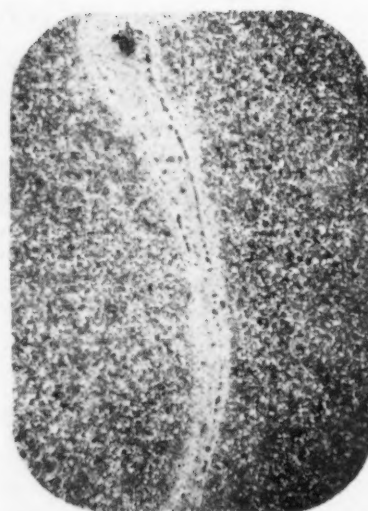
THERE are about 20 steel inspection tests of a general nature which are commonly used and many more, not directly related to service tests, which are not so common. In addition there are almost innumerable special service tests which imitate the particular service to which the steel is to be subjected.

Despite all these tests, there are many instances where inspection is inadequate or even useless. For instance, a premium is paid for steel made by the electric furnace process, and yet there are no tests

by which we can determine whether the steel received has been made by this process. While not universally accepted, it is probably true that better average quality is obtained in electric furnace than in open-hearth steel, but it is difficult to measure this. In fact, wherever a better average or greater uniformity is secured, it becomes an inspection problem to insure the



FIG. 1—Carbon segregation in a broken crankshaft is shown in this illustration.



MAGNIFICATION 100x DIAM. CUTTING 100x

FIG. 2—Phosphide segregation is revealed in this steel sheet broken during a drawing operation.

obtaining of these qualities. This is true because of the need for better testing methods and because nearly all metallurgical inspection is applied only to a small percentage of the steel received. Many of the tests destroy the steel tested and we are left to hope that the



Fig. 3

remainder of the heat of steel is as satisfactory as that destroyed by test.

Another example of steel for which there is no adequate inspection method is that for vitreous enameling. Certain materials have been satisfactory for this purpose, but one cannot be assured of uniformity of steel. Recently enamels have been developed which can be applied to some steels. In a plant where large tanks were fabricated and lined with vitreous enamel, it was found that the enamel chipped off of some of the plates in the tank while it adhered well to others. Metallographic examination revealed oxide inclusions just under the surface of the steel at the point at which the enamel chipped. It was found that all the plates having the inclusions just under the surface and from which the enamel chipped, came from one mill and all the good plates from another mill. The difficulty was solved by using only the steel from the latter mill.

New Tests Urged for Tool Steels

Still another instance of inadequate inspection is found in tool steels. With some notable exceptions, these are generally purchased by brand name and not by specification, because inspection methods cannot be depended upon to select only the steel which has a satisfactory cutting life. Many other examples could be given, but those enumerated suffice to show that new testing methods are badly needed. Of course, in some of the above instances, service tests

AT RIGHT
AND LEFT

FIG. 3-4—Specifications have been drawn in which the number of inclusions per unit of area are limited. Illustrations show part of the General Motor's chart in which this is done.

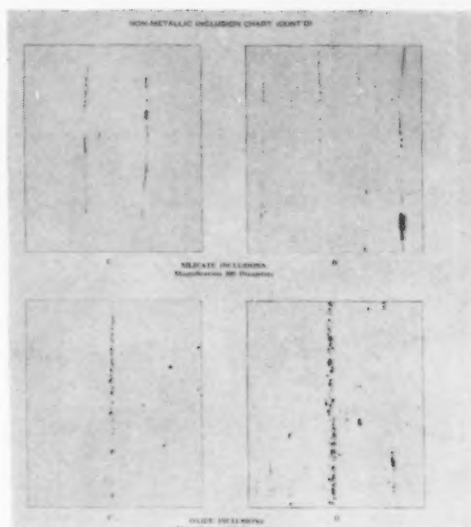
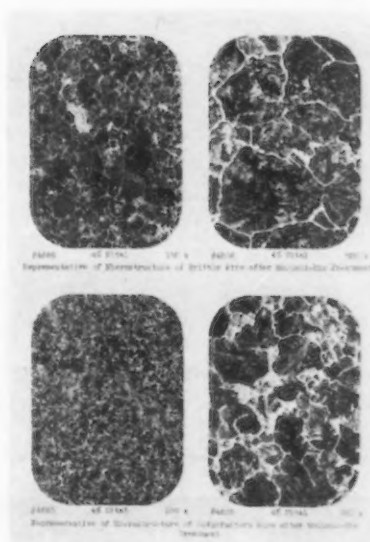


Fig. 4

BELOW

FIG. 5—Microstructures of brittle and of satisfactory wire after McQuaid-Ehn treatment.



could be devised to inspect these materials, but the cost would probably be prohibitive. Moreover, the relative tonnage of steel represented by these cases is small. By far the greater tonnage of steel can be purchased on specification and accurately inspected for its suitability for the use for which it is intended.

The 20 inspection methods and tests of general application are: chemical analyses, spectroscopic analyses, inspection of bar surface, fracture examination, deep acid etch, hardness, tensile strength, compressive strength, torsional strength, impact tests, bend tests, Erickson cup tests, metallographic inclusions, metallographic structure, grain size, abnormality, decarburization, application of heat

treatment and observance of performance, depth of hardness penetration and X-ray examination. Inspection tests used in more specialized cases are corrosion resistance tests, creep tests, Strauss test for embrittlement of stainless steels, high amperage tests for fissures, magnetic tests, and rate of oxidation tests for temperature-resisting steels.

When steel is to be used in important parts, such as automotive gears or crankshafts, it is customary to keep together all of the tonnage from one furnace melt and give it a heat number, since it is expected that steel made from the same melt will all behave the same. This is only true, however, if the ingot and mill practice have been proper. It is easily possible to have steel bars from the same melt behave differently due to segregation of carbon or manganese or other impurities. It is desirable, therefore, to analyse more than one bar of steel from a heat, even if the mill analysis is known. Common practice is to analyse up to 10 per cent of the bars, but usually only six bars from a carload. Comparison of these analyses will give an idea of the quality of the melting and ingot practice. In examining large plates used in making large vessels the thickness of which is 3 or 4 in., so that one ingot of steel is rolled into one plate, I have personally observed as much as 0.25 per cent variation in carbon content in the plate. Such a variation as this in bar stock would

(CONTINUED ON PAGE 59)

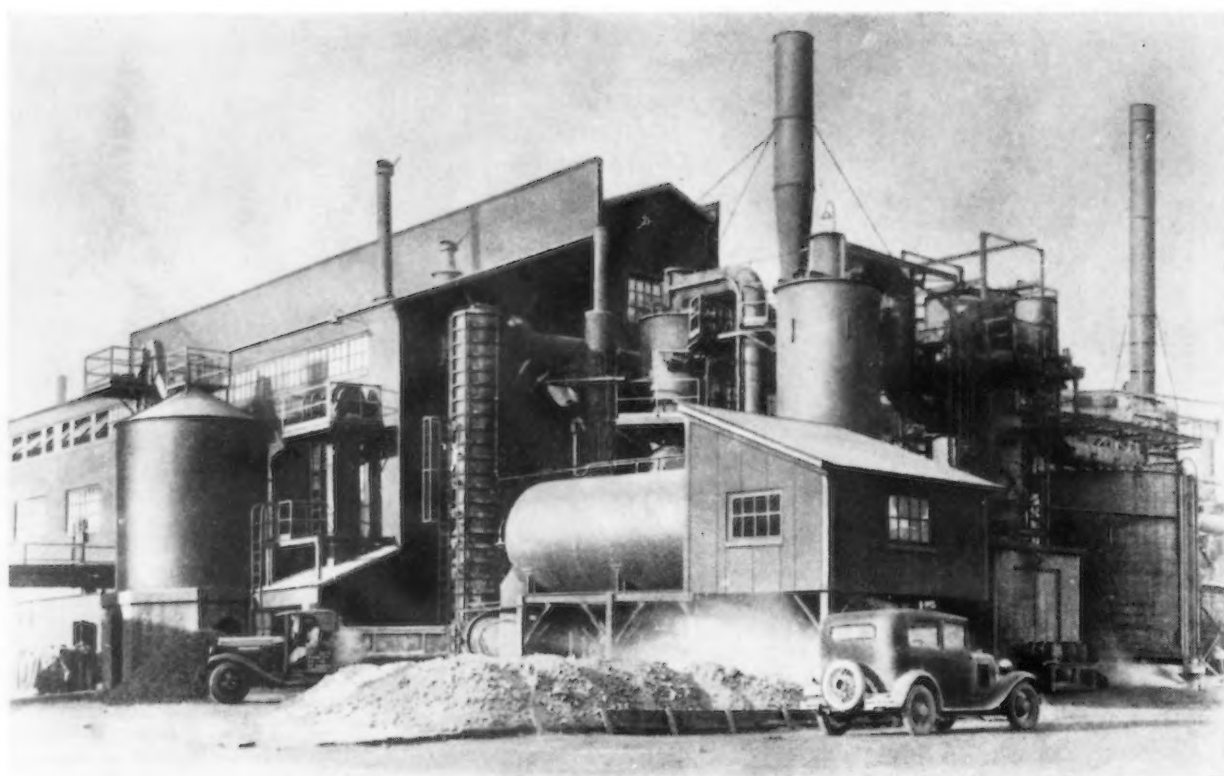
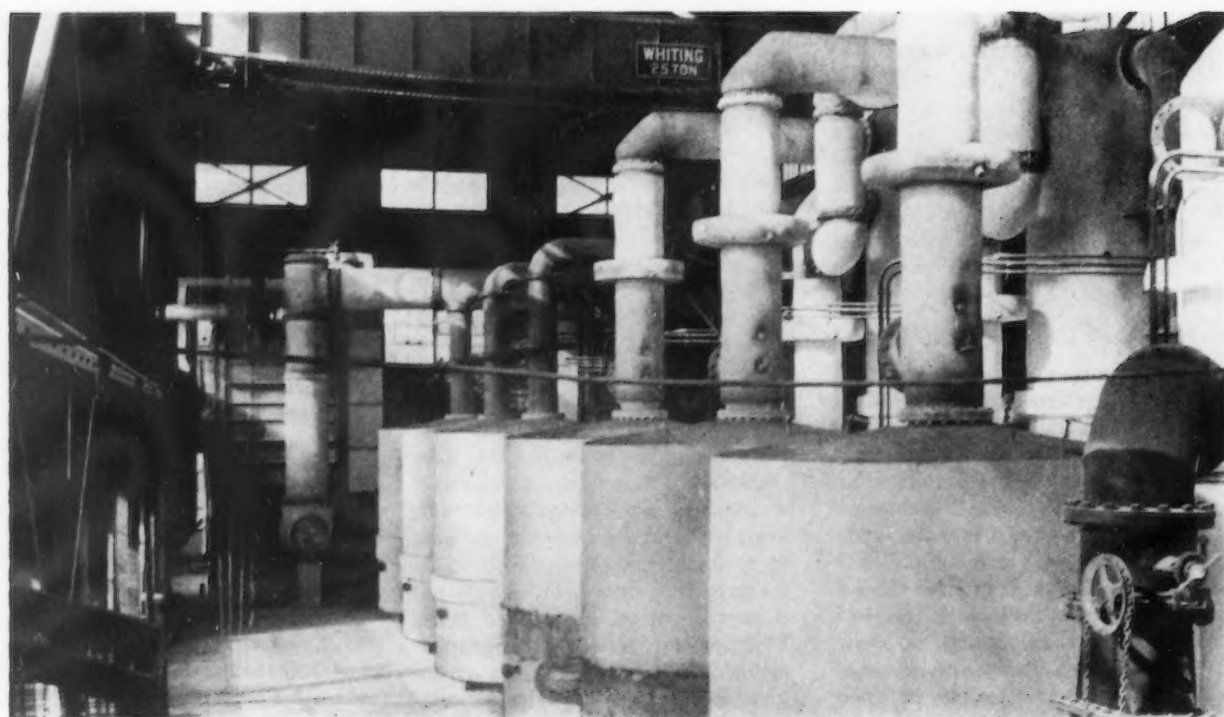


FIG. 1—Exterior view of the first plant installed to convert waste ferrous-sulphate into contact sulphuric acid. Gas-washing towers, acid-absorption towers and coolers are shown here.

o o o

FIG. 2—Interior of a contact acid plant showing the main production equipment which includes these vanadium catalytic converters.

o o o



Reconditioning Pickling Solutions

By S. F. SPANGLER

*Chemical Construction Corp.,
New York*



SULPHURIC ACID pickling solutions have been so widely used for cleaning steel plates and shapes that steel mills and fabricators consumed approximately one-twelfth of America's production of sulphuric acid in 1934. Although the total use in the steel industries during that year was above the 1932 and 1933 requirements, it was still much less than what can reasonably be expected upon return of normal business conditions.

Sulphuric acid is, therefore, an important expense item in steel treatment and one in which modern economy can help the steel industry combat rising production costs and low selling prices.

A spent sulphuric acid pickling solution has, in the past, been discarded as a waste by-product because ferrous-sulphate as such was hard to purify and was very little in demand. Reclamation did not justify the necessarily expensive evaporation and crystallization processes required for production in marketable quality, except in those few mills having but small quantities of the waste liquor and favored with an attractive selling outlet for the purified sulphate. The common disposal practice for the spent liquor has been to dump it into some stream or other adjacent water. Any contained value thereby became a total loss, to which had to be added the disposal expense. Steel treaters had not

worked on a close profit margin and willingly accepted this loss as a matter of necessity until in more recent years authorities began to show increasing opposition to the pollution of public waters. As ferrous-sulphate and its accompanying weak acid in spent pickling solutions are detrimental to plant and fish life, some neutralization process then had to be employed before legal disposal could

IN the pickling of steel products, the sulphuric acid weakens until, when spent, the solution consists of very weak acid and the ferrous-sulphate formed from chemical combination of the consumed acid with the steel. For many years the disposal of this waste solution has been a serious problem with most industrial plants. However, the new method described herein not only eliminates the disposal problem but economically converts the spent liquor into strong sulphuric acid suitable for further pickling operations. The conversion is accomplished without the escape of fumes, without waste, and at a substantial money saving over other forms of disposal.

be effected, especially where the dumping of acid liquors is forbidden. Conversion of the harmful ingredients in the waste liquor to nullify their effects added to the disposal expense, and produced no useful by-product to offset the added costs. As a result, disposal of the spent pickling liquor became a greater source of trouble and expense than ever.

On the other hand, the sulphur content in the spent liquor is just as good for making fresh sulphuric (pickling) acid as is sulphur obtained from other sources. Chemical engineers have therefore sought economical means both for recovery of value through conversion of the sulphur from the waste liquor into sulphuric acid, and for elimination of the costly disposal problem.

From the chemical standpoint, sulphuric acid (H_2SO_4) is simply a combination of sulphur trioxide (SO_3) and water (H_2O). Sulphur trioxide is produced by the oxidation of sulphur-dioxide (SO_2) under certain definite conditions. Theoretically, ferrous-sulphate may be oxidized into ferric-sulphate which in turn may be roasted into iron-oxide and sulphur trioxide. Also, ferrous-sulphate roasted alone decomposes theoretically as



However, many difficulties are encountered in either oxidizing fer-

(CONTINUED ON PAGE 64)

Electric Aids to Precision Rolling of

By HARRY A. WINNE

*Industrial Engineering Department
General Electric Co.*



ANY discussion of recent electrical control developments must, almost of necessity, include a dissertation on electron tubes. Just why we call them "tubes" is a question; our English

friends use a much more appropriate term, "valves," for that is what they really are, valves by which the flow of current can be controlled. There are many types of tubes (or valves), but only three of them will be described, and this

in language as simple as possible.

These tubes are generally glass affairs, something like ordinary incandescent lamps in appearance, containing two or more "electrodes." In many of them one electrode, the "cathode," consists of a heated filament, again something like a lamp filament. If we have a simple two-electrode vacuum tube having one heated electrode or "cathode," and a cold electrode or "anode" (or plate), and apply sufficient voltage between the two electrodes from an external source, current will flow through the tube, but only when the anode or plate is positive. That is, this tube is a rectifier.

Now suppose we insert a third electrode, or "grid," between the cathode and anode. So long as no potential is applied to this grid it has no effect on the flow of current through the tube. But, if we make it negative with respect to the cathode, it will decrease or even stop the current flow, and if it is positive the current increases.

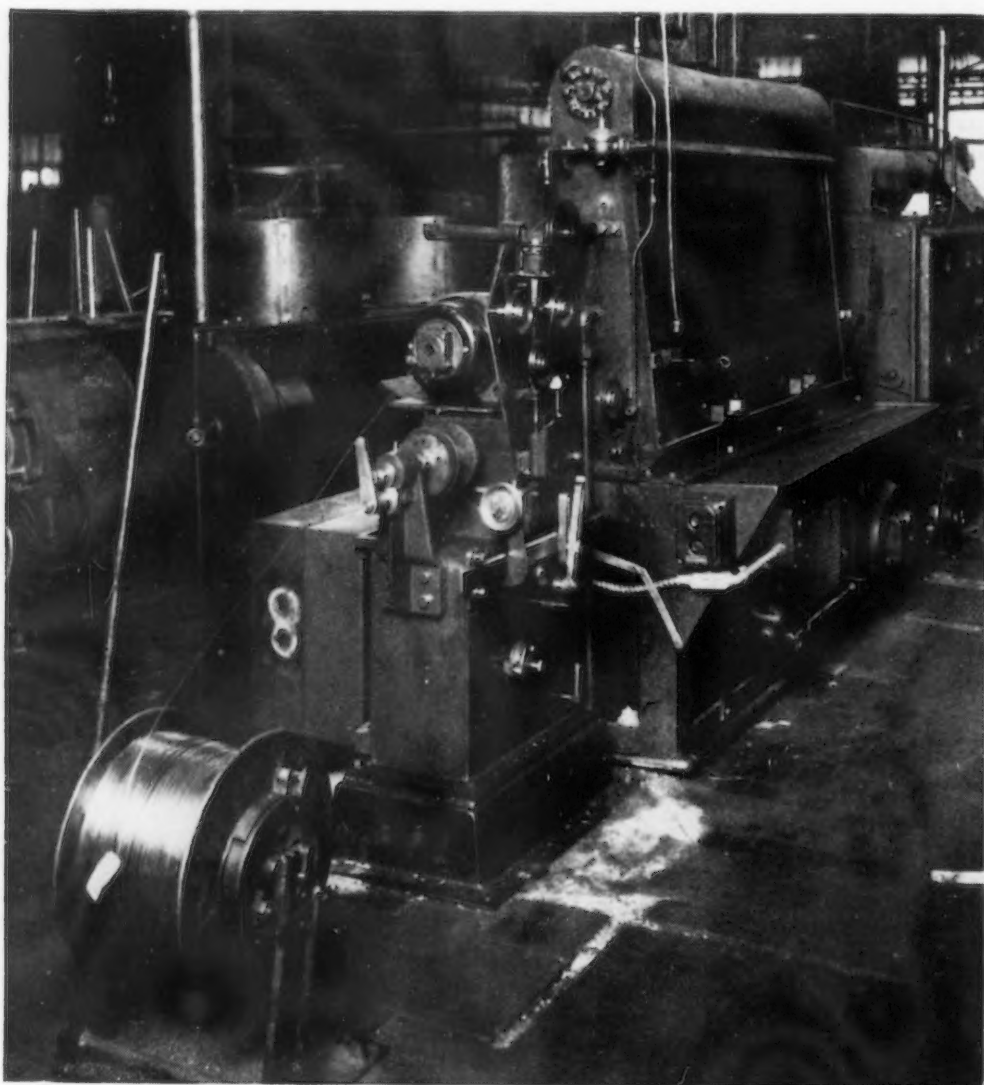


FIG. 1—Wire drawing equipment with reel motor controlled by Thyratrons to maintain constant wire tension.

The flow of current to the grid itself is negligible so long as it is negative, the usual condition of operation, so that an extremely small amount of power applied to the grid can control the much larger output of the tube. In other words, this tube is an amplifier, so familiar in our radios and so useful in tube circuits for control purposes.

The Thyatron Tube

In the just-described high vacuum or "pliotron" tube, the grid potential has complete control of the situation at all times. Now, if we put a little mercury vapor in the tube we have a different state of affairs. It has now become a "Thyatron" tube, and the grid has lost some of its control. If the grid is maintained negative with respect to the cathode by about 20 volts or more, no current will flow. That is, the grid can prevent the current from starting. But once the current begins to flow from anode to cathode, the grid is powerless to stop it, because of ionization of the mercury vapor. But if the anode current stops, the grid can prevent its starting again, or tell it when to start. If we apply alternating current between anode and cathode, since this is a rectifying tube and current can pass in only one direction, the flow automatically ceases on alternate half cycles, and this gives the grid a chance to regain control.

Then if we apply negative potential to the grid for the first half of the positive half-cycle, current will flow for only one-half the time that it would with no potential, and the average value of the rectified current will be reduced one-half. By applying an alternating potential to the grid, of the same frequency as the anode potential,

ELECTRON tube devices are being employed increasingly in steel mills. They are used to maintain constant tension in reeling wire, to control lighting, and in flag or limit switches on rod mill shears, plate mill tables, automatic sheet catchers and other equipment. In one plant they are arranged to permit control of soaking pit covers from the crane cab. Photoelectric pyrometers can be set up for indicating and recording the temperature of tubes passing through a seamless or lap-weld mill, or of rails, sheet bar and other

materials; furthermore, the arrangement may include means to prevent a piece of metal from entering the mill unless its temperature is within a predetermined limit. In addition to applications, Mr. Winne describes briefly the characteristics of three different types of electron tubes, namely the high vacuum, or Pliotron; the Thyatron; and the phototube, or "electric eye." The first part of his article, in THE IRON AGE of March 28, page 18, dealt with the use of Selsyn devices, electric gages, and draft gages.

and shifting the phase of the grid potential with respect to the anode, we can vary the time of conduction from zero to the full half cycle.

Therefore, if we use a pair of these Thyatron tubes—a pair in order to rectify both halves of the a-c. wave—to supply power from an a-c. source to the armature of a d-c. motor, we can control the current input to and the speed of that motor by adjusting the phase angle of the grid voltage. A simple means of doing this is to provide a resistance-reactance bridge circuit to supply the grid. Then by varying the reactance, the phase angle of the grid voltage can be shifted. The variable reactance may consist of a coil with a movable inner core.

An application of Thyatron speed control is in reeling wire from a high-speed wire-drawing block, where it is desired to maintain constant tension in the wire

going on the reel. The reel is driven by a d-c. motor, supplied with power from Thyatron tubes. The wire is carried from the die to the reel over a system of pulleys such that a loop in the wire supports the core of the solenoid which controls the tubes. The weight of the core, or a combination of weight and springs, is adjusted to give the desired tension. In operation the core will float, taking up a position which gives the motor just enough voltage to cause it to run at the proper speed. The same system of loop control may be applied to continuous timing machines, or similar equipment.

The Thyatron tube makes an excellent relay, as it acts within one-half cycle, and its output of controlled power may be many amperes, whereas that of the Pliotron tube is limited to milliamperes.

The phototube, sometimes called the "electric eye," has two cold electrodes. One of these, the cathode, is coated with a substance which gives off electrons when light falls on it. Caesium is commonly used. With potential applied from anode to cathode, the current flow through the tube will depend on the amount of light flux falling on the cathode, and is proportional to it. The current which flows, however, is only a few microamperes even at high illumination, too small

source of trouble. They are either pounded by heavy pieces of metal, or there is difficulty in operating them from thin sheets and strip. With a phototube flag switch there is no more wear and tear if the light beam is hit by an ingot than if it is intercepted by a sheet of tin foil; and the sheet of tin foil will operate the flag just as certainly as will the ingot.

Standard photoelectric relay equipments will operate on light flashes of 1/10 sec. or less, so they

are amply fast for flag switch service. A light beam takes up no space, and phototube flag switches can be installed where there is no room for the mechanism of a mechanical switch.

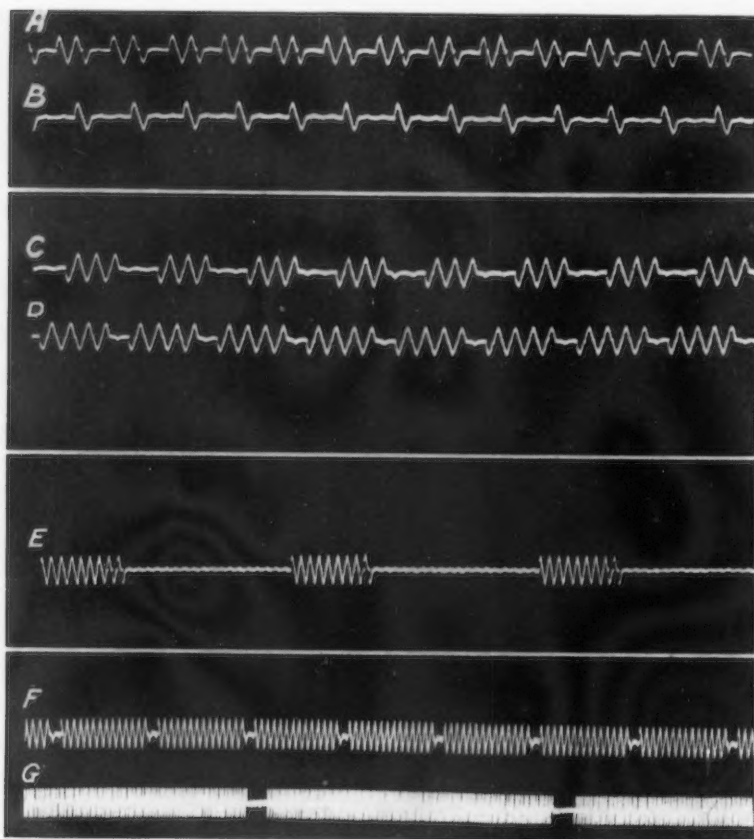
Phototube flag or limit switches have been installed on rod mill shears, plate mill tables, automatic sheet mill catchers, ore hoists, pipe facing machines, and in many other applications. In some cases, the phototube is actuated directly by the radiation from hot metal. This is only feasible if the temperature is of the order of 1500 deg. F., or more. In others, the metal intercepts a beam of light passing between a light source and the tube.

Use of phototubes in control circuits permits replacing control cables by light beams. In at least one plant, the soaking pit covers are controlled from the crane cab through phototubes mounted on the wall and light sources mounted on the crane. Master switches in the crane cab energize the lights, which in turn actuate the phototubes on the wall, and these then pass the word on to the magnetic control panels for the pit cover motors.

Photoelectric Pyrometer

The measurement of temperature is a difficult problem. We cannot measure it directly as we do length, weight, or volume, but instead must measure some other property of matter which varies with its temperature, and use it as a criterion.

The energy radiated from a body increases with the temperature,



to operate any mechanical relay. So we call on our friend the Pliotron tube to amplify this current and pass it on either to a mechanical relay or to a Thyatron tube which in turn may control a motor, a solenoid, a valve, or what-not.

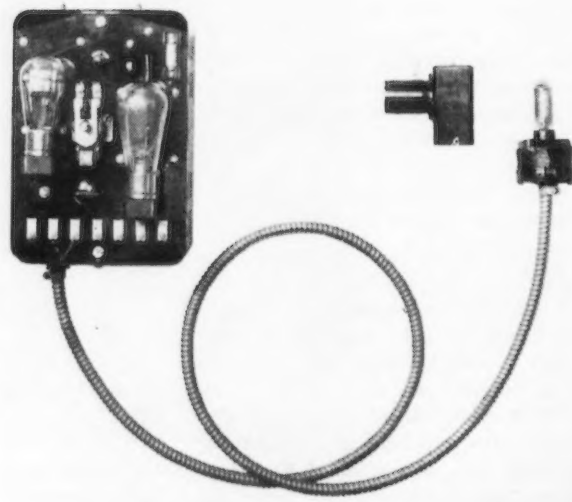
Phototube or Electric Eye

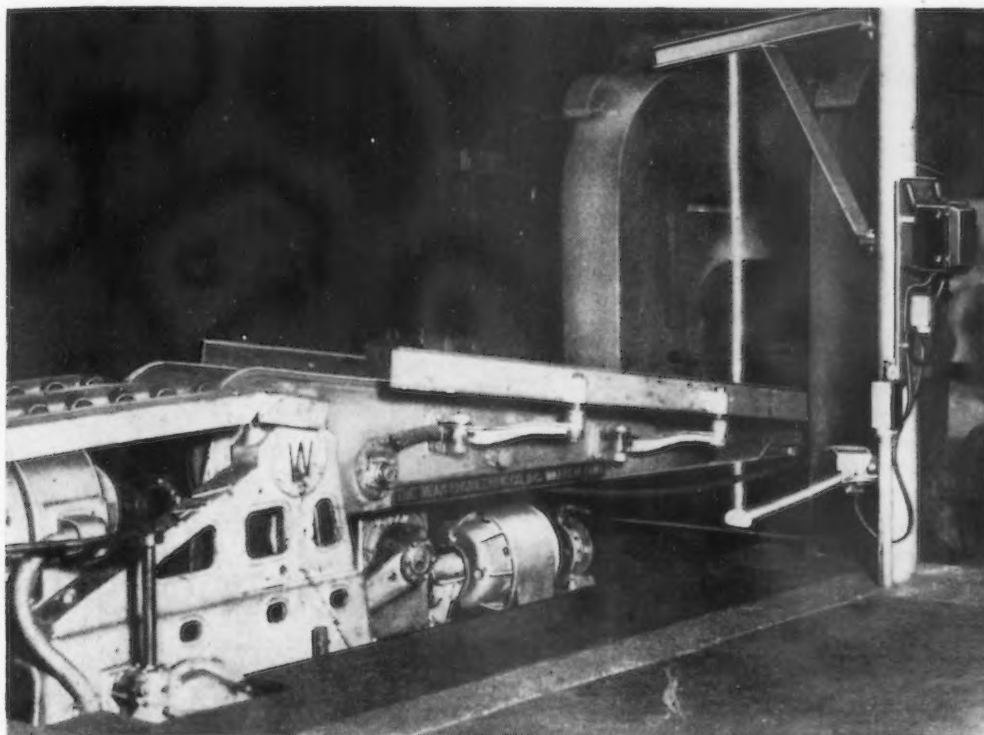
The phototube has many uses around a steel mill. It may be employed to control lights, turning them on when needed, and off when natural light is sufficient, resulting in both better illumination and a saving in power.

As a flag or limit switch it has many advantages. Mechanical flag switches in a mill are an endless

ABOVE
FIG. 2—Oscillograms of current input to line welder controlled by Thyratrons. Note the range in adjustment obtainable.

AT RIGHT
FIG. 3—Standard photoelectric relay equipment, with covers removed.





AT LEFT

FIG. 4—Phototube flag switch in use on automatic sheet catcher.

BELOW

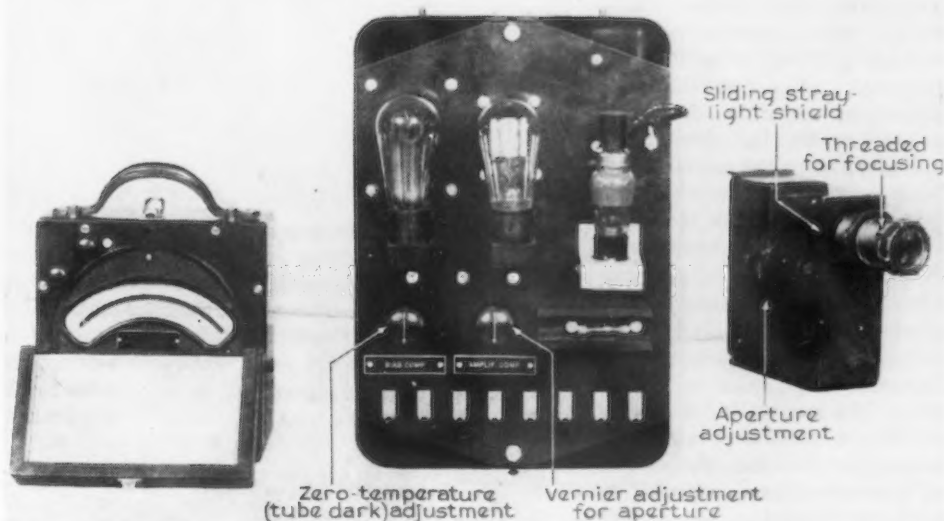
FIG. 5—Photoelectric pyrometer equipment.

• • •

and the amount of this radiation is used by optical and radiation pyrometers as a measure of the temperature. Fortunately, the phototube is responsive to the radiation from a hot black body at temperatures above 1400 deg. F. and, therefore, can be used as the actuating means of a pyrometer for temperatures above this value.

The photoelectric pyrometer consists essentially of a phototube in a suitable housing, an amplifying tube, and an indicating or recording meter. A rectifying tube to furnish direct current for the equipment, and a voltage regulating tube, are usual accessories.

The phototube is mounted in a metal housing, as shown in Fig. 5, with an aperture through which it "looks at" the body whose temperature is to be measured. The radiation reaching the tube causes it to let a certain amount of current flow through it, and the amplifying circuit causes a proportional current to pass through the indi-



cating or recording meter. These are calibrated to read in degrees F. or C., as desired.

Since the response of the tube depends on the total amount of radiation it receives, it is essential that the mounting be so placed that the "field of vision" of the tube is entirely covered by the hot metal whose temperature is to be measured. Also, it must receive enough radiation so that it will give a proper indication. For example, for a temperature of 2000 deg. F., with the tube 3 ft. from

the metal, the minimum area of metal which will give adequate response is approximately 2 sq. in.

The phototube makes a very sensitive pyrometer for temperatures within its range, for its response varies about as the tenth power of the variation in temperature. If the calibration is checked at reasonable intervals an accuracy of plus or minus 10 deg. F. can be maintained.

One advantage of the photoelectric
(CONCLUDED ON PAGE 66)

THIS is the second of two articles on the relation of motive power to current innovations in railroad equipment. The author concludes that displacement of steam power by oil-electric power will be restricted and specialized rather than sweeping.



MUCH of the impetus to the trend toward internal combustion motors as prime movers for railway motive power units in this country has been based on the developments abroad, and we have been prone to accept isolated installations in marine and railway work as representing definite accomplishment of that perfection in service which has come to be associated with steam power. Unfortunately these expectations have not been fulfilled, either from the standpoint of dependability or economy in operation. The developments of the last few months have given us some actual results which railroad men must analyze with great care before embarking on too involved a program of Dieselization.

The results which have been obtained in stationary and marine practice with Diesel power cannot always be duplicated in railroad service. In marine and stationary work it is possible to provide ample foundations for the Diesel unit, and the section and weight of the details can be made as great as the conditions demand.

In railroad work, however, the designer is limited to the characteristics of the railroad for wheel load, clearances, etc. This, coupled with the fact that the Diesel motor is only one part of a very complex mechanism, the complete unit being a combined power plant and tractor, introduces complications not encountered in other fields. Many Diesel motors used in rail units have given trouble for the reason that the designers were unaware of the conditions which railroad operation involves. Design of parts for strength only will, in many cases, fail to provide that struc-

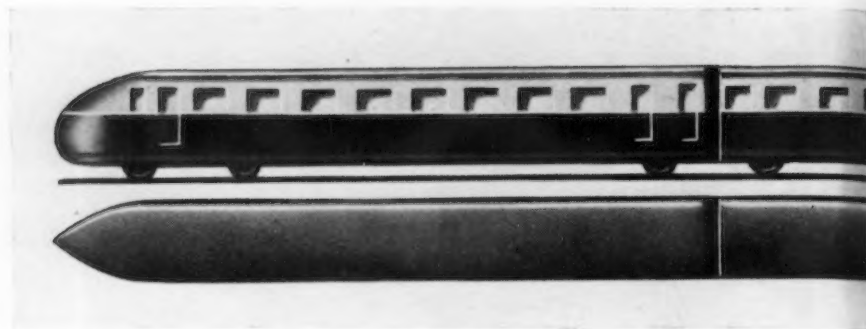
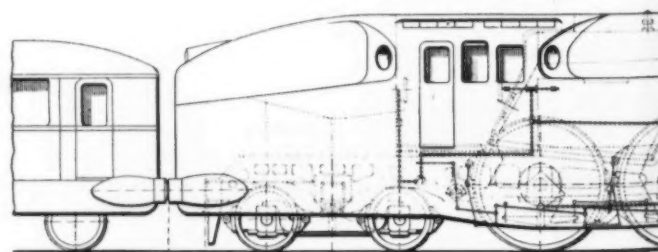


FIG. 1—Light train comprising streamlined steam locomotive and double coach, designed by intended for speeds up

Will Changes in Revolutionize

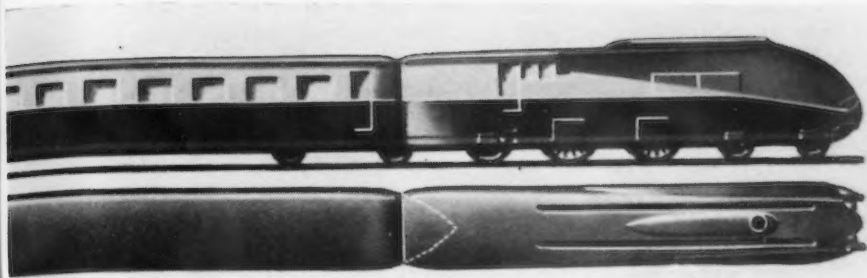
tural stiffness necessary to stand up under the pulling and buffing shocks inherent in railroad operation. The steam locomotive has set a standard for dependability in service which, over the entire range of railroad operation, it is difficult to match.

Marine installations hold the most promise for the Diesel motor. It is, therefore, significant to observe the trend toward the replacement of comparatively recent Diesel units with steam power. In 1926 the Royal Mail Steam Packet Co. built a 22,000-ton ship, the As-



Cylinders, diam.	460 mm. (18 1/4 in.)	stroke	750 mm. (29 1/2 in.)
Boiler working pressure	20 kg. per sq. cm. (284 lb. per sq. in.)		
heating surface, tubes and flues	137 sq. metres	1,474.1 sq. ft.	
firebox	16	172.2	
	153	1,646.3	
superheater	69	742.4	
Total	222	2,388.7	
Grate area		2.76 sq. metres (29.7 sq. ft.)	
Maximum speed		170 km. per hr. (105.6 m.p.h.)	

FIG. 3—Another streamlined high-speed locomotive



Henschel & Sohn A. G., Kassel, Germany. The locomotive can be used at either end, and is to 100 miles an hour.

Motive Power the Railroads?

By G. W. ALCOCK
Lima Locomotive Works, Inc.

turias, and the next year followed it with a duplicate, the Alcantara. These were outstanding vessels built by Harland & Wolff, Ltd., each powered with Diesel motors of 20,000 hp. *London Engineering* of October 12, 1934, carries a very interesting account of the replace-

ment of the propelling machinery of these two vessels, from which the following is quoted:

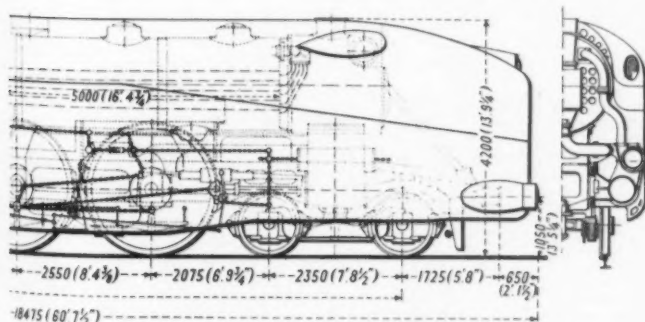
Recently the exigencies of the South American service have called for increased speed, and it was of course necessary to provide the additional power required at the lowest cost consistent with high operating efficiency

and in the least possible time. These requirements did not permit the machinery spaces to be broken into, or the position of the shafting to be altered, and the solution to this very interesting problem in marine engineering, arrived at between the owners and the builders, was to employ geared turbines with the existing shafting and to fit new propellers.

Johnson water tube boilers designed for a working pressure of 450 lb. per sq. in. with integral high-temperature superheaters were applied, with Parsons triple expansion turbines. The exigencies of the service referred to was the introduction into this service of German vessels, steam powered, which were faster than the motorized ships. In order to compete successfully it was necessary for the owners of the vessels to make the conversion. Inasmuch as the original motor installation applied represented the most recent development of the Diesel art at the time the vessels were built, it would seem as though only considerations of the most serious nature would have justified the expense of an entirely new steam power plant in such a short space of time.

A. I. Lipetz, consulting engineer for the American Locomotive Co., in a paper which he read before the Canadian Railway Club, properly called attention to the difficulties in operating a single locomotive of special design, whether steam or Diesel, owing to its being different from all others, and the difficulty in fitting it into the regular and sometimes conservative conditions of operation and maintenance.

Any criticism of this kind, however, would not apply to the 35 Diesel trains purchased by the Netherlands Railways. These trains were three cars each, the front car having the power unit, designed for 820 hp., with electric transmission. After the trains were in service for a maximum of 10 weeks they were all removed from service, according to a statement issued to the Dutch press by Ir. W. Hupkes, superintendent of rolling stock. The troubles encountered have been a matter of much controversy in the Dutch press, the principal trouble being that when the trains were operated at comparatively slow speed, as is sometimes necessary even if the trains are designed for high maximum



Coupled wheels, diam.	2,300 mm. (7 ft. 6 1/2 in.)
Carrying wheels, diam.	1,100 mm. (3 ft. 7 1/8 in.)
Wheelbase, rigid	5,100 mm. (16 ft. 8 1/2 in.)
total engine	14,350 mm. (47 ft. 1 in.)
Weight of engine, empty	98 metric tons (97 tons 9 cwt.)
in working order	126 metric tons (124 tons)
Adhesion weight	54 metric tons (53 tons 3 cwt.)
Water capacity	16.5 cu. metres (3,630 gallons)
Fuel capacity	5 metric tons (4 tons 18 cwt.)

(4-6-4 type) now under construction abroad.

speed, the characteristics of the Diesel engine equipment and the electrical equipment were not properly inter-related. The trains are all being rebuilt.

The experience of the Canadian National Railway in the operation of the high horsepower articulated Diesel-electric locomotive is probably the best measure of what may be expected in the operation of such a locomotive under our own conditions. R. G. Gage, chief electrical engineer, went into this quite extensively in an article entitled "Oil-electric Traction on the Canadian National Railways," published Aug. 10, 1934. At that time the articulated units had been disconnected, one being in the shop for reconditioning, and the other working separately. His conclusions were expressed as follows:

"The indications on the Canadian National are that the most useful oil engine of the future is a locomotive of from 600 to 800 bhp. capacity."

German Experience

No survey of actual operations of Diesel equipment in either land or marine work would be complete without consideration of what the Germans are doing. The Flying Hamburger was, of course, the prototype of this type of equipment. The latest information as to what German engineers are developing, and the extent to which the German Railways are giving consideration to motive power is contained in the address which Direktor R. Ing. Litz made before the sixth technical session of the Interessen Mining Association on Dec. 29, 1934, and the address which Prof. Dr. Ing. H. Nordmann made before the German Mechanical Society Aug. 1, 1934. A study

of these statements indicates that although careful investigation is to be made of all forms of internal combustion units, it is now the national policy to encourage the use of coal instead of oil. The published account of the addresses of these gentlemen states:

The Flying Hamburger was the first to establish regular service involving speeds up to 160 km. (99.4 miles) per hour, for the transport of 100 passengers, and its immediate success led many to believe that further developments in high-speed rail transport could be attained only by motorization. The experience of the last two years has shown, however, that the steam locomotive is capable of development for speeds and load meeting all requirements for many years to come.

Nor does this require the use of extra-high pressure, turbine, pulverized coal, or other special types of locomotives designed primarily to improve thermal economy and involving more or less radical departure from established construction. Existing standard types of locomotives can be developed organically and by streamlining for speeds of 175 km. (108.7 miles) per hour in express, and 90 km. (87 miles) per hour in goods service.

Streamlined Steam-Power Train

As a result of their experiments with all forms of motive power, the German State Railways had Henschel & Sohn A. G., Kassel, design an articulated train with a 4-4-2 type steam locomotive, illustration of which by permission of the *Railway Gazette* is reproduced herewith, Figs. 1 and 2.

The haulage of this train with 128 seats is said to show a lower per seat cost than the Flying Hamburger. The schedule on which it is operated is said to show a normal speed of 150 km. (93.2 miles) per hour, rising to 160 km. (99.4 miles) per hour for short distances. The present tendency in

Germany, however, is toward greater seating capacity, and by permission of the *Railway Gazette* of London there is reproduced in Fig. 3 an illustration of a 4-6-4 type high-speed tank locomotive, two of which are under construction for the German State Railways by Henschel & Shon, A. G., Kassel.

Special steam locomotives are also being built by the Borsig Locomotive Works, and by Krupp.

The experience of the German State Railways with the cost of these various types of motive power parallels our own experience here. In his address Dr. Litz stated that for the cost of two cars like the Flying Hamburger the railway could purchase a complete train consisting of a steam locomotive and five or six special coaches with 50 per cent higher power and correspondingly increased seating capacity.

A. H. Fettes, general mechanical engineer, in an address to the Railway Club of Pittsburgh on Jan. 24, 1935, outlined the record-breaking trip which the Union Pacific streamlined train made from coast to coast and concluded with this statement:

In order to cross the continent with only \$70 worth of fuel it was necessary to make a large investment in the total power plant, consisting of the Diesel engine and the electrical transmission system. The electric transmission is only 80 per cent efficient at the best power output, and the losses may run up to 40 per cent or 50 per cent at times. While the manufacturers have supplied a substantial Diesel engine weighing 20 lb. per bhp., it is necessary to add 42 lb. per bhp. for electrical equipment to transmit the engine power to the wheels.

Until the manufacturers of electrical equipment can improve power efficiency (CONCLUDED ON PAGE 86)

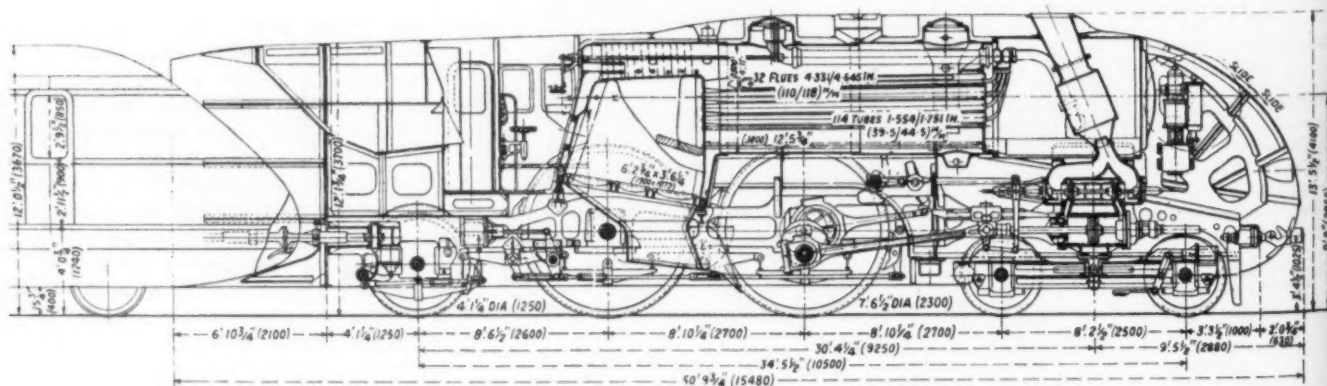
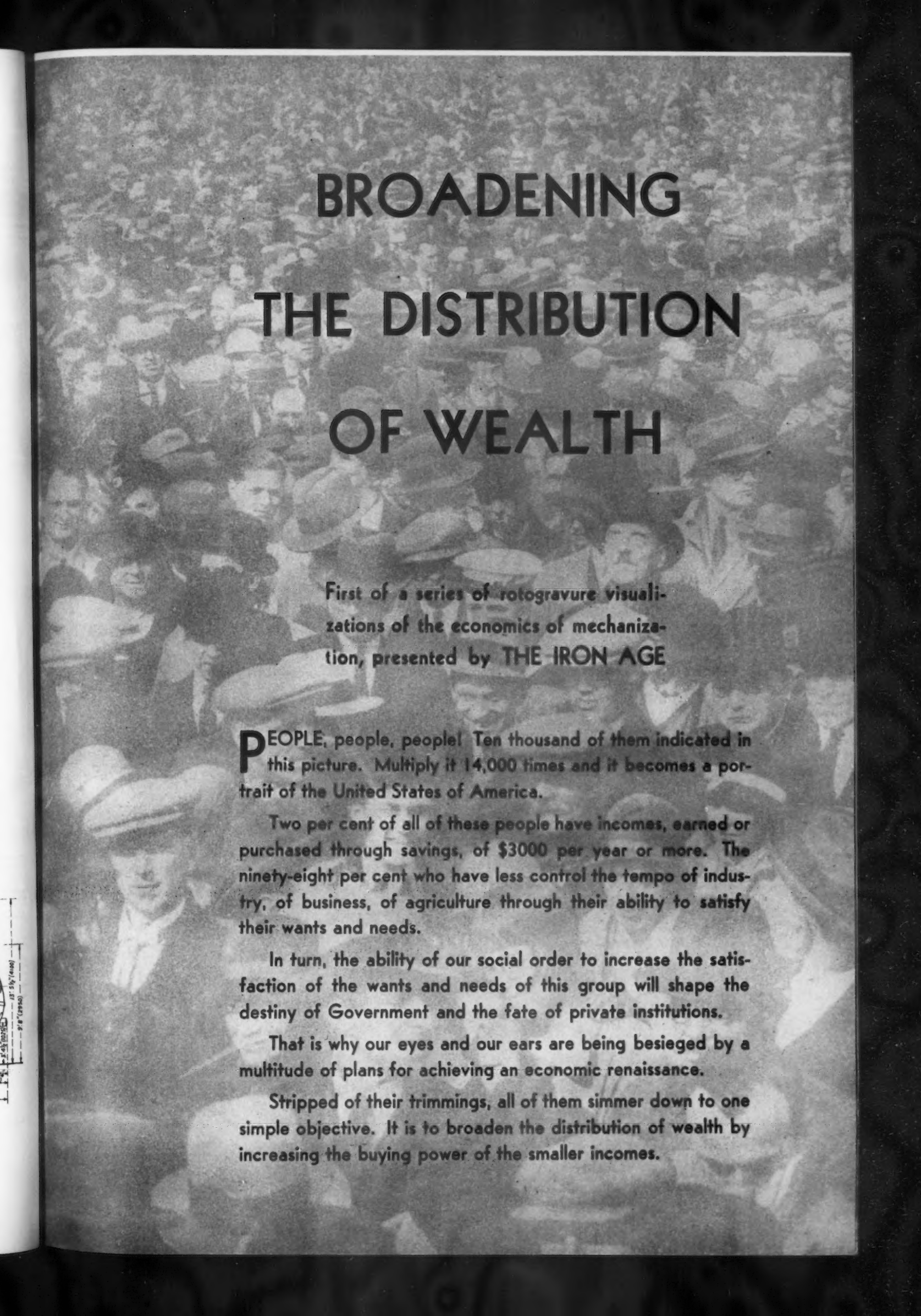


FIG. 2—Sectional view of streamlined tank locomotive with inside cylinders and 7 ft. 6 1/2 in. diameter coupled wheels for high-speed service.



BROADENING THE DISTRIBUTION OF WEALTH

First of a series of rotogravure visualizations of the economics of mechanization, presented by THE IRON AGE

PEOPLE, people, people! Ten thousand of them indicated in this picture. Multiply it 14,000 times and it becomes a portrait of the United States of America.

Two per cent of all of these people have incomes, earned or purchased through savings, of \$3000 per year or more. The ninety-eight per cent who have less control the tempo of industry, of business, of agriculture through their ability to satisfy their wants and needs.

In turn, the ability of our social order to increase the satisfaction of the wants and needs of this group will shape the destiny of Government and the fate of private institutions.

That is why our eyes and our ears are being besieged by a multitude of plans for achieving an economic renaissance.

Stripped of their trimmings, all of them simmer down to one simple objective. It is to broaden the distribution of wealth by increasing the buying power of the smaller incomes.

NOW let us turn from "We the People" of today and take a look at our grandfathers. Here we have a visualization of how they worked and what they got for it.

Digging, lifting, carrying; their labors taxed the limit of physical endurance. Even clerical work was laborious when it had to be done by common pen and ink bottle.

The scene below conveys an idea of the working ways in our grandfathers' time but it does not portray the working days. To get a visualization of them, look at this picture six days a week for 12 hours each day.

No wonder that so many of our grandfathers were "used up" at the age of forty. And no wonder that they had little time for anything except work.



WHAT did they get for what they gave? That, too, is indicated in this picture. Certainly, it would not be enough to satisfy many of us today and fortunately it did not satisfy our grandfathers.

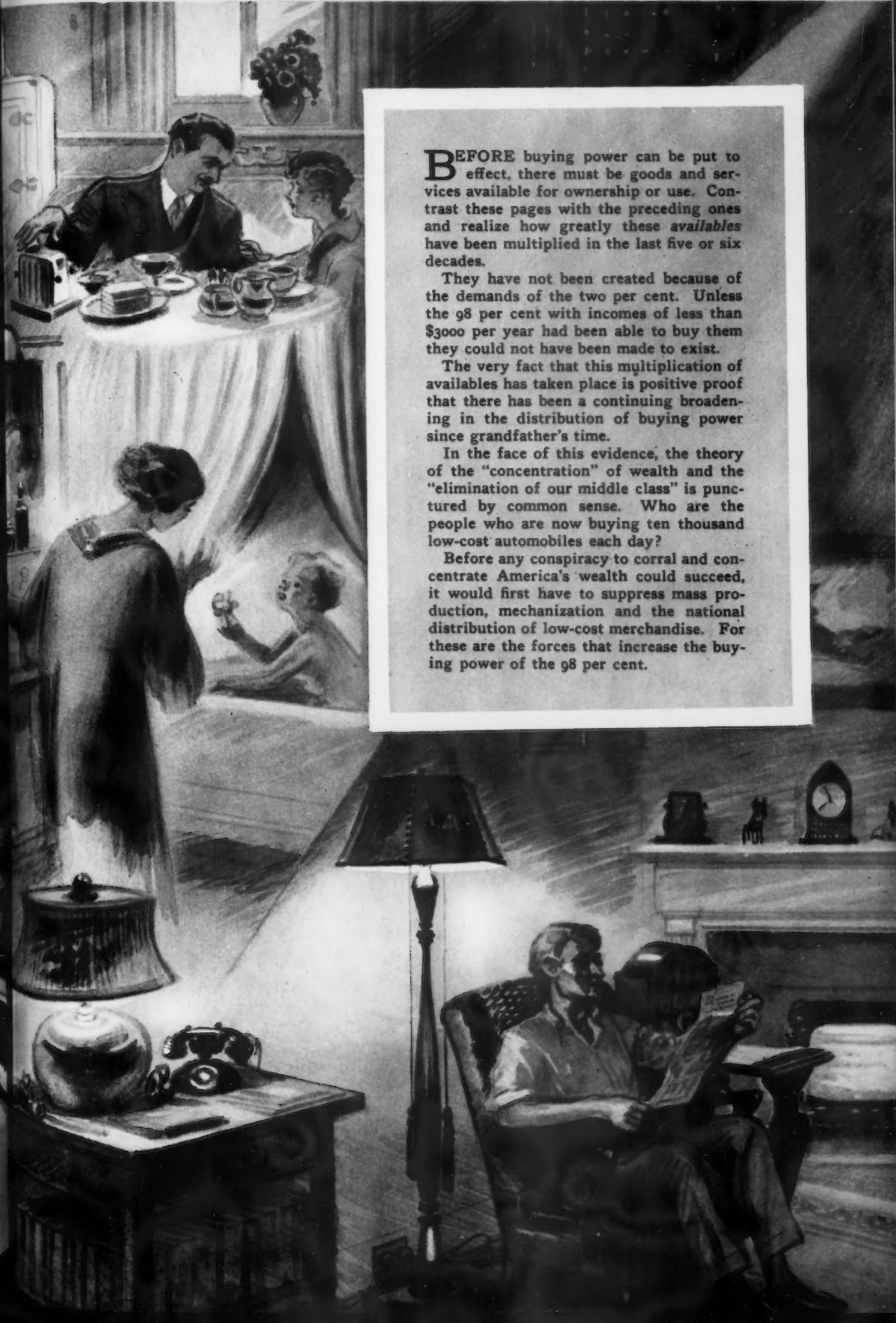
They, too, wanted something that today we call "a broader distribution of wealth." But while most of these grandfathers wore boots with bootstraps, they were too sensible to try to lift themselves thereby.

They paid scant heed to the "greenbackers" and the populists or the Owens, Georges and Bellamys of that day who offered them something for nothing and more for less.

Instead, they put their brains to work to make a given expenditure of human effort bring larger individual returns.







BEFORE buying power can be put to effect, there must be goods and services available for ownership or use. Contrast these pages with the preceding ones and realize how greatly these *availables* have been multiplied in the last five or six decades.

They have not been created because of the demands of the two per cent. Unless the 98 per cent with incomes of less than \$3000 per year had been able to buy them they could not have been made to exist.

The very fact that this multiplication of *availables* has taken place is positive proof that there has been a continuing broadening in the distribution of buying power since grandfather's time.

In the face of this evidence, the theory of the "concentration" of wealth and the "elimination of our middle class" is punctured by common sense. Who are the people who are now buying ten thousand low-cost automobiles each day?

Before any conspiracy to corral and concentrate America's wealth could succeed, it would first have to suppress mass production, mechanization and the national distribution of low-cost merchandise. For these are the forces that increase the buying power of the 98 per cent.



OUR grandfathers chose mechanization as the vehicle to travel the road to plenty. Their choice has been primarily responsible for the tremendous increase in buying power that has occurred since their time.

Buying power is the one true measure of prosperity or wealth. Money is not a measure of it. Germany found that out in 1923, when a trillion marks would not buy a peck of potatoes.

The social value of mechanization is enhanced by the fact that it works simultaneously in four constructive ways. It enlarges the number of things to be had; it decreases the cost of things; it raises real wages; and it increases employment.*

In addition to doing these four things which increase buying power and spread it more evenly over larger areas of population, mechanization does something even more important for humanity. It abolishes physical slavery. Contrast the erect postures of today with the stooping, toil-worn postures of people of 50 years ago.

Mechanization is an emancipator as well as a wealth distributor.

*To be dealt with in detail in a succeeding chapter in this series.

NINETY-EIGHT out of every hundred Americans have incomes of less than \$3000 a year. Yet one American family in every three owns a motor car. In grandfather's time, not one family in 500 could afford a horse and buggy.

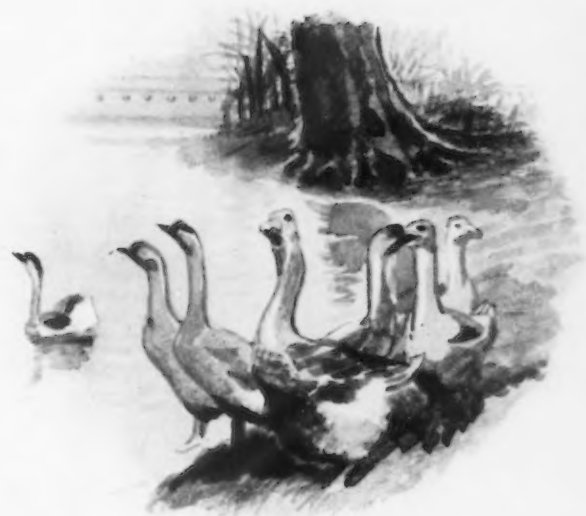
Does not that show conclusively that mechanization has proved to have dollar magnifying power?

This power is not static. The Golden Goose of mechanized wealth production is capable of laying eggs of constantly increasing size and value, if we keep it *modernized*. Constant improvement is the price of prosperity.

In these confused times, too many people are attempting to talk or to legislate us into prosperity. That would be getting something for nothing.

The trouble with us is that we do not realize that we must pay the price of modernization to secure prosperity. It can only come, and stay, through cost reduction. Marking up price tags and wage rates will not bring it. We have found that out by experience and experiment.

And trading Democracy for Fascism or Communism will not bring it. We have found that out by observation.



EIGHT million man-years of new work. That is what would be required of America's machinery builders if they were called upon to fulfill the actual needs for improved production equipment in the industries of the United States.*

Our Golden Goose has been neglected during the past five years. It needs modernizing. And the means to do it and thus to make certain of larger and still larger golden eggs of buying power, of income and of profit, are available today.

Some of us have been too busy preaching bootstrap economics to think about

fundamentals of wealth production. And others have been too frightened by these preachings to continue their former sound policies of replacement. But our creators of mechanization have been busier than ever. They have made available for our use, during the past few years, the means for putting industrial America upon a new and unparalleled basis of efficiency.

If private initiative, encouraged by national policy, would put these available means to work now, we would shortly absorb our surplus of unemployment and add a full third to the buying power of every dollar of income.

* From a recent survey by Machinery and Allied Products Institute.

"Many Men of Many Minds"



"The only way that distribution of wealth can be effected without the destruction of wealth is through the operation of a competitive system under which more goods will be produced at lower prices."

Lewis W. Douglas, at
Wharton School, March 14



"If in some way it were possible to turn out 50 per cent more industrial goods at a lower price, agriculture would be able to buy more and there would be more factory workers to be fed in the cities."

Henry A. Wallace, before
House Appropriations Committee, March 14



"Economic life advances only through increasing production by use of every instrument Science gives us, through lowering of costs and prices with consequent increase in consumption."

Herbert Hoover, March 23

MAPI Issues Survey of Machinery Requirements

Immediate "Wants and Needs" of Industry Aggregate \$18.5 Billion

MACHINERY and Allied Products Institute has now made public the results of its detailed survey as to machinery requirements due to "pent-up" demand.

The MAPI survey was made directly through the members of its 58 member trade associations, each of which covers its separate and distinct industry and is representative of at least 85 per cent to 90 per cent of the volume of industry production.

The details concerning needed machinery replacements were contributed through the use of a survey form which required details as to type of machinery and cost, and one of the remarkable aspects of the survey has been the extent to which minute details were given. It also is particularly significant that while the survey form did not require company name, suggesting that identification instead might be by reference to industry, employers almost without exception revealed their names, and the executing signatures were those of presidents and operating vice-presidents, in this particular again demonstrating the care and accuracy of the returns. The further use of established classification of industries and proportionate ratios has made it possible to present what is believed to be a highly accurate and most significant table of the extent of obsolescence and need for replacement of machinery throughout American industry, based not upon theories of average life and obsolescence through in-

vention, but instead upon actual figures of tangible, present needs.

These Are Actual Requirements

These figures are of *machinery requirements*. They take no account of the dammed-up flood of equipment business existing in industries apart from the machinery industries. They do not include for example the broad equipment needs in other durable goods industries, such as housing for 1,000,000 families, necessary rehabilitation of 16,000,000 homes, requirements for industrial housing estimated at \$1,000,000,000, and other construction needs, all of which alone are variously estimated at \$11,000,000,000 and more. The figures given in the following tables are for machinery and allied products alone.

Item	Requirements	Per Cent of Total
Agricultural imple- ments	\$731,840,500	3.94
Electrical machinery, apparatus, etc.	6,060,902,423	32.63
Engines, turbines, tractors and water wheels	1,203,636,153	6.48
Foundry and machine shop products.....	7,299,830,376	39.30
Machine tools.....	724,410,648	3.90
All other machinery..	2,554,011,900	13.75
Total	\$18,574,632,000	100.00

The total disclosed by these estimates approximates three-fourths of the official valuation of all the Class 1 railroads in the United States. It is equivalent, in round figures, to nearly the full amount collected in taxes by the Govern-

ment—Federal, State, county, city, town, village and district—for two full years. It is half as much again, in round figures, as the accumulated deficits in the national treasury since the depression began. It is nearly four times as much as the tremendous total sought by the President for work and other relief during the coming fiscal year.

Would Eradicate Unemployment

Sixty-five per cent of \$18,574,000,000 is \$12,073,000,000, which represents the pay roll cost of producing machinery and equipment required at the present time for modernization of American plants. Here is a twelve billion dollar order to American labor, in the mine, on the farm, in transportation, in the factory, in the office.

The average hourly rate of pay may be estimated conservatively at 60 cents in the machinery industries and a calculation on that basis reveals that the \$12,073,000,000 pay roll would purchase 20,123,000,000 hours of labor, in round figures. This is equivalent to the employment of 8,000,000 workers for one year, or of 4,000,000 for two years.

The survey figures afford interesting opportunity for study of the sources of machinery replacement. Of particular significance are the figures of machinery needed by the builders of machinery, themselves comprising an important segment of the capital goods industries and representing an important portion of the totals for all American industry. The figures

revealed by the survey for this source of machinery business follow:

Requirements Classified	Purpose			
	Replacement	Additional	Total	Per Cent
Machine tools	\$15,471,482	\$15,678,549	\$31,150,031	68.65
Electrical equipment	1,789,511	1,543,416	3,332,927	7.34
Handling and service	891,439	1,542,768	2,434,205	5.37
Power plant and boilers	1,831,373	679,998	2,511,371	5.53
Other machinery	3,926,184	2,022,684	5,948,868	13.11
Total	\$23,909,989	\$21,467,413	\$45,377,402	100.00

The study carried further results in a breakdown tabulating the classifications of needed machinery and resulting in the schedule of percentages shown in the following table. Worthy of particular observation is the fact that metal working tools account for 68 per cent of this demand.

	Per Cent
1. Miscellaneous machine tools* (not otherwise listed)	12.00
2. Lathes	11.00
3. Motors (electrical)	9.23
4. Machinery other than machine tools (not otherwise listed)	8.83
5. Milling machines	7.38
6. Turret lathes	5.74
7. Boring mill	5.45
8. Power plant and boilers ..	4.93
9. Drills and drill press	4.32
10. Surface grinder	3.08
11. Welding equipment	2.88
12. Handling equipment—trucks	2.85
13. Tool grinders	2.72
14. Radial drills	2.28
15. Planers	2.15
16. Hoists	2.01
17. Cranes	1.92
18. Cylindrical grinders	1.78
19. Gear cutters	1.64
20. Shapers	1.43
21. Power transmission	1.31
22. Presses (mechanical and hydraulic)	1.02
23. Heat treatment equipment ..	.92
24. Key seaters85
25. Generators—electric85
26. Polishing lathes78
27. Internal grinders65
	100.00

Appended to its survey, MAPI lists the essential reasons why machinery should be bought now. They are as follows:

1. **Prices are now at their lowest;** machinery cannot be sold for less than it sells for at the present time. Increased demand in any line of industry inevitably is accompanied by rising prices; to this inflexible working of the law of supply and demand the machinery industry is no exception.
2. **Funds.** Fortunately some firms have liquid funds drawing at best a low rate of interest, or none at all; these funds could be better invested in your own plants. Some of these funds may be made up of your depreciation reserves. Furthermore, credit is becoming easier.
3. **Skilled mechanics to build and install machinery** are more plentiful now than

they will be later. Surprising as it may seem, skilled labor is drifting away dur-

ing these depression years to other occupations, only to find they have lost much of their skill on returning to their old jobs.

4. **Machinery can be installed now without disturbing plant routine.** The time required to install new foundations, for instance, and the consequent disturbance to plant operation, mean relatively little in slack operating periods, but constitute a tremendous handicap in a time of flush demand.
5. **Keep men on the payroll busy.** Many manufacturers have retained on their payrolls competent men for whom they really have had insufficient work. These men can invest full time in removing old machinery and aid in the installation of new—a direct saving.

6. **No delay in delivery.** Machinery usually is of special order and design and not available from stock; generally it is manufactured to order upon plans and specifications. During quiet times orders are given immediate attention and delivery is prompt. To expect prompt delivery when plants are busy is to court disappointment, delay in production and, in many cases, loss of business.

7. **Productive efficiency.** We must face the fact that taxes will not be lower—not soon—but that they are bound to be higher; because production costs are climbing upward daily, codes, old-age pensions, unemployment insurance, maternity welfare and other items which mark the progress of time will have their effect on rising costs.

8. **Preparedness.** Most urgent will be the necessity of decreasing costs. Plants not efficiently equipped cannot expect to secure business from competitors who, because they have modern machinery, are able to get the most out of each invested machinery dollar. Those operating under old processes with worn-out or obsolete machinery cannot fail to be undersold continuously. Also, we should be becoming conscious of the need for foreign trade; to get our share we must decrease production costs to balance the lower labor standards and wages in European countries.

Stilwell Urges Tool Loan Liberalization

LIBERALIZATION of banking practices in order to permit loans for plant modernization and purchases of new machine tools and other manufacturing equipment to be classified as productive loans instead of capital loans, is urged by Charles J. Stilwell, president of the National Machine Tool Builders' Association.

Because of the outlays involved in the purchase of new machine tool equipment or in retooling, most manufacturers, and their bankers, have hesitated to make provision for new commitments in machinery and manufacturing equipment, Mr. Stilwell said. From these should be excluded the automobile manufacturers, who have led the way in purchases of new manufacturing equipment despite adverse economic conditions, and whose plants are operated upon superbly efficient principles of speed and economy. Most others, however, under pressure of economizing, have allowed their plants to reach a high degree of obsolescence, with the bulk of the machinery that produced more than \$70,000,000,000 worth of goods in 1929 still in

place and operating at everincreasing costs in labor charges, frequency of breakdowns and repair charges.

"The revelation by the Machinery and Allied Products Institute that a pent-up demand for machinery worth eighteen and a half billion dollars, together with a prospective payroll of more than twelve billions in meeting that demand, have been built up during the depression years probably comes as no great shock to the bankers and the financial community at large," Mr. Stilwell said. "But it serves to press home the fact that a substantial part of the machinery now in operation is obsolete and should be replaced by newer equipment in the interest of economy and efficient operation.

"Much of the new machinery and machine tools with which to build it involves heavy expenditures. Very few manufacturers, after the terrific punishment the durable goods industry has undergone, are in a position to finance such expenditures without banking help. The average banker in turn is not versed in the mysteries of produc-

tion and the methods by which efficient levels of manufacture may be maintained. This is no more to be wondered at than the fact that the average industrialist is not well versed in many of the controversial banking subjects of the moment. The fact remains, however, that the average banker

is far too apt to look upon the purchase of new machine tools as just another capital investment without giving sufficient thought to the self-amortizing values of such a machine. He does not recognize the savings in costs which can be effected by the introduction of up-to-date modern machinery, and its

ability to pay for itself over a comparatively short period of time.

"Of course, the broad economic influences of modernizing America's vast production plant are incalculably constructive in every community and to every financial institution."

Five-Room Steel House For \$2,000

LOW-COST home construction for the man with a small income is expected to give impetus to the building industry which has been painfully lagging during recent years. Many experiments have been conducted to devise ways and means of providing the working-man with an attractive house well-insulated, fire-resistant and lightning and vermin proof, the purchase price of which would fall within the scope of his modest budget. The Steelox Co., Chicago, has gone past the experimental stage, having perfected its plans to the point where actual prices are named for various structures and the fabricated material is available.

Steelox is offering a five-room steel house for \$1,350 f.o.b. factory. This price includes wiring and lighting fixtures, plumbing and plumbing fixtures, hardware and all other accessories. This house can be erected for \$400 to \$600, including insurance against structural failure and against damage from fire, lightning or windstorm. If the work should be done by the purchaser himself, the erection cost

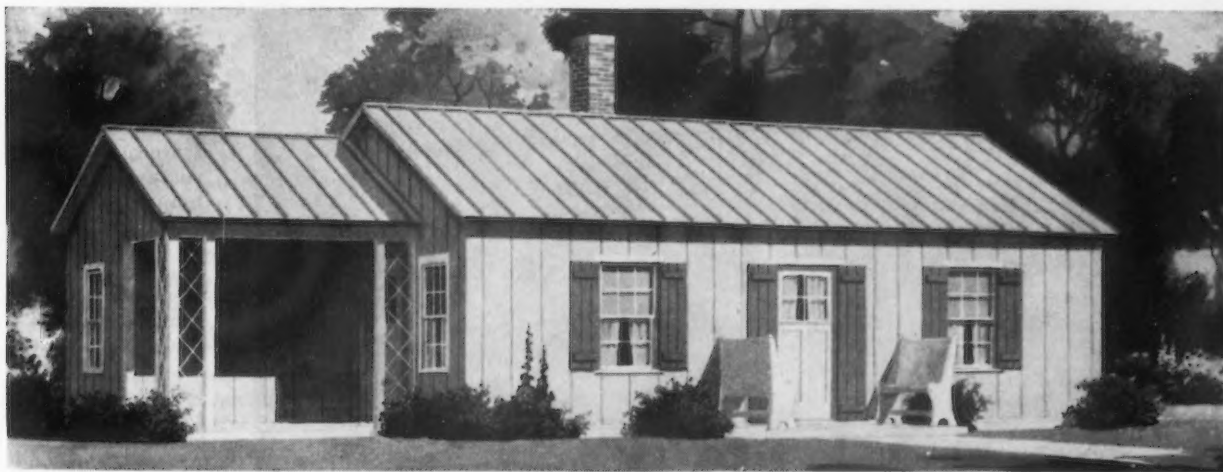
would be considerably less. A suitable lot for the house would cost about \$250. The entire investment in the house, ready for occupancy, would be around \$2,000.

It is anticipated that a buyer could finance a loan through a local bank or home loan company, in co-operation with the Federal Government, up to as high as 80 per cent of the value of the house. Thus, the cash needed for the transaction would be limited to the cost of the lot plus the first down payment. The remainder could be paid as rent in monthly installments of \$15 to \$17.

A one-car garage of all-steel construction can be secured from Steelox for \$235 erected, or a two-car garage for \$400. The man who wants to start a small business of his own can buy a filling station for \$1,250, a two-car greasing station for \$1,550, or a small store, shop or office building for about \$1,000. In each case the price includes cost of erection. For those who wish a week-end cottage or tourist's cabin and garage combined, an all-steel structure can be secured for \$500 erected.

Commercial buildings can be torn down and reassembled in another location, but houses are erected for permanency. Concrete slabs usually form the foundation of the house, although other materials can be used or a basement can be included in the plans. It is not essential to buy the entire house. Purchases can be confined to the walls, roof and incidental parts for construction, the remainder of the materials and furnishings being bought from local dealers. Walls and roofs are of interlocking, self-framing steel construction made out of 20-gage heavily galvanized Armco sheets. The unit for both walls and roof is a patented channel-shaped panel known as Steelox. The panel is 16 in. wide, 3 in. deep and of wall height. It has flanged sides so the flange of one panel slips into that of an adjoining panel. The interlocked flanged sides serve as structural members 16 in. apart. The panels are fastened in position with simple hook bolts, and a furring strip is attached to the flange for finishing interior walls. This serves as a nailing strip and also destroys

(CONCLUDED ON PAGE 45)



THIS five-room house costs \$1,350, plus freight. The erection cost is \$400 to \$600. The price includes wiring and lighting fixtures, plumbing and plumbing fixtures, hardware and all other accessories.

Design Assures Alinement of Chuckling Machine Units

ENGINEERS are doing more than their part in leading us from the pioneering stages of mass-production into a more orderly period during which the niceties of equipment can be utilized to effect a more promptly-available flexibility in the production of quantities which are definitely related to demand; this flexibility to serve industry in removing at least some of the "guess-work" involved in inventory production.

As a result we now have identical machinery capable equally of

peak-production and of the smaller-quantities production such as we, as producers, have learned to respect during the past five years.

This new engineers specification, if it may be called such, involves interchangeability and wear reduction in unquestionable forms. Additionally it serves in cutting down both machine operating and machine maintenance costs.

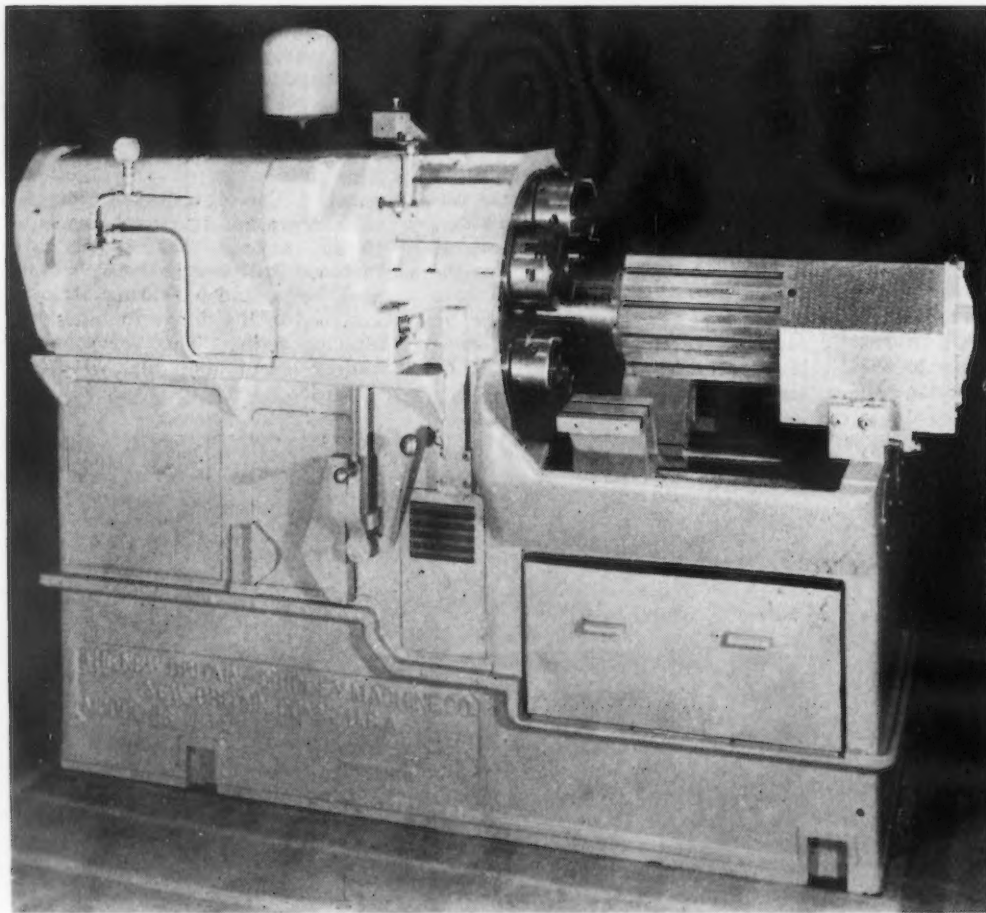
As to fields of useful operation, applied engineering ability and cooperation are well marked within the machine tool industry

and are of value not only to the builder, but to the distributor and the user of modern machine tools.

Such value is capable of illustration through descriptive reference to many of the more flexible cost-reducing machine tools. However, for the purposes herein, reference will be made to basic design and developments thereof, as employed at the New Britain-Gridley Machine Co., New Britain, Conn., in the manufacture and operation of New Britain Gridley chuckling machines. The illustrations are from photographs of the No. 16, 9-in. swing, 6-spindle automatic chuckling machine.

"Skeletonized" Design

In the line of machines produced by this company, skeletonized frames and housings have permitted an extreme use of fixtures that embody locating-points on original or basic surfaces, rather than the use of fixtures located on or from transferred points or surfaces. For example, through the use of one master fixture, 12 finished shaft bushings are assembled with extreme accuracy in cored frame-holes through a pouring process involving the use of an anchoring alloy made up of bismuth, lead, and tin.



THE "accumulator" member of the hydraulic system is the dome-like unit mounted at the top of the housing. The pump is at the side of the powercase, slightly below and at the left of the accumulator.

Not only does such design-consideration contribute much in the way of shop convenience in manufacture, but it spells for certainteeing those accuracies required for the interchangeability of units when the finished machines take their places in production lines.

Rigidity too, becomes an established machine element because of the fact that with skeletonized frame design, any weaknesses, productive of error, are quickly located and inexpensively remedied. Development of this design has recognized that rigidity in each part contributes to the accuracy of all parts, both in machine manufacture and in the parts fashioned by tools used in production.

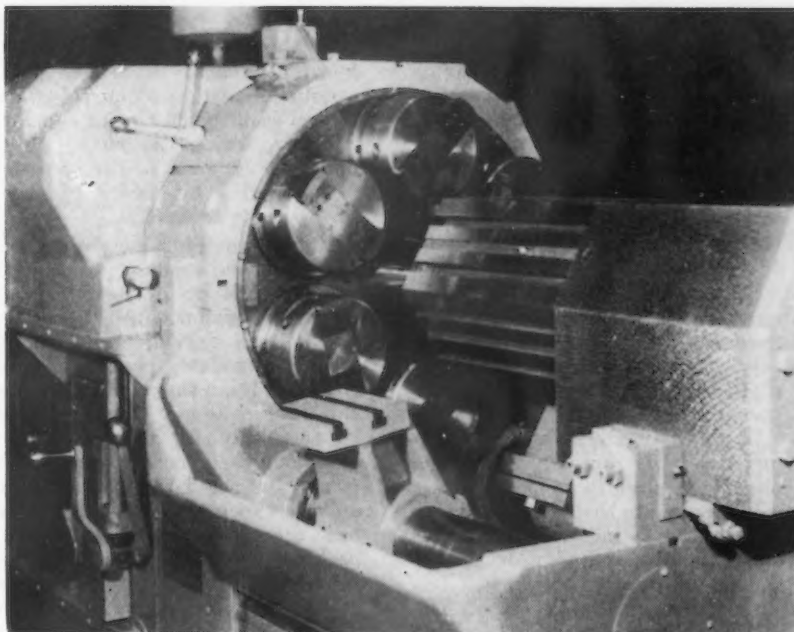
Jigs, Fixtures, and Interchangeability

With original basic locating points used in the finishing of surfaces upon which various units are mounted, interchangeability without the disturbing of other units, becomes an evident possibility. For example, under this manufacturing procedure, it is said that 98 per cent unit-interchangeability is enjoyed by users of the six spindle automatic chucking machine pictured with this article. Accessibility is, therefore, an evident part of the design in so far as this virtue pertains to manufacture and assembly.

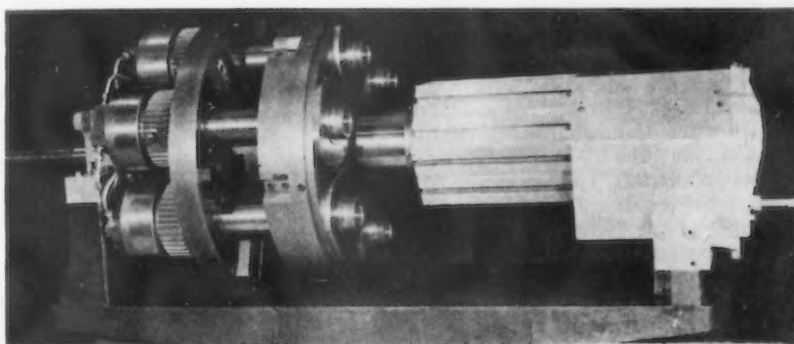
The skeletonized frame with all units mounted is inclosed in a skeletonized cast-metal housing. That is, housing sections are easily and conveniently removed, opened or lifted as the case may be by the operator or persons, who may for any reason need to make investigation of conditions with respect to any particular unit or units. This housing feature of accessibility is likewise available without disturbing other housing sections. Yet, as a complete unit, the housing is rigidly held in position by supporting members of the skeletonized frame.

The Cylinder Operation

In connection with the mounting and operation of the cylinder unit, a noteworthy feature is the provision whereby the revolving cylinder, which carries the six chucking spindles, when in its non-revolving position rests upon two opposed locating plugs or pads having contoured support faces. These plugs are assembled in position through heavy bosses from the two sides of the cylinder frame member. The contoured faces of the plugs are a few thousandths below the finished outside circumference of the cylinder when it is in its rotating position, supported by its 8-in. diameter cylinder stem or



THIS view shows the chucking spindles, the main tool slide and the crossslides which are operated by rise cams in conjunction with main tool slide movements.



A MOUNTED view of the spindles and main tool slide assembly, as positioned in the skeletonized frame and housing in the view above.



AT (A) is shown the plugs or pads upon which the cylinder rests when the stock removal operations are being performed by the tools.

shaft. In operation, the cylinder supporting members revolve on ball bearings and in the indexing movement, the finished circumference-surface of the cylinder does not contact the plugs, and therefore there is no opportunity for wear upon either the plugs or upon the cylindrical surface, and thus no necessity for compensating adjustment.

The indexing is by Geneva movement, and at the end of each indexing turn, the rotation has carried the cylinder-locking slots slightly past the center of the opposed locking plungers held in the cylinder casing. The bottom entering-edge of one index-locking plunger is slightly tapered and as it is forced into the locking-plunger slot in the cylinder, its action is to draw the cylinder back the amount of rotative distance it has passed the plunger center. The upper entering-edge of the opposed plunger is tapered sufficiently to permit of this backward rotative movement.

The flat surfaces (bottom) of the two-plungers are slightly tapered, as are the plunger slot surfaces over which they pass, and as the plungers complete their entrance into the cylinder plunger slots through pressure exerted by rugged multiple-leaf springs which back up the operating arms, the heavy pressure draws the cylinder down a few thousandths, by slightly flexing the 8-in. supporting stem or shaft. This slight movement brings the finished circumference of the cylinder into contact with the two supporting plugs or pads A, one on either side of the vertical center line of the cylinder and positioned at right angles to the finished circumference. The plungers hold the cylinder in this contact position with the plugs or pads while the tools perform their functions. When the work of the tools is finished, the plungers are cam-withdrawn by movement of the operating arms, the cylinder supporting shaft flexes into straightened position, and in so doing, lifts the cylinder a few thousandths clear of the surfaces of the contact plugs. The cylinder then automatically indexes while supported by its center shaft-stem, rather than by circumferential bearing between its bottom sector and a companion cylinder casing sector. Thus all wear at this point, where wear is critical in its relation to spindle and tool alignment, is avoided.

Lubrication and Hydraulic Operation

The machine is lubricated by the flood system. A reservoir in the bed houses 15 gallons of oil. A

pump on the side of the power unit housing forces oil to a hydraulic valve in which is an equalizing piston. From this valve the oil is directed to the chucking cylinder, which has 50 to 250-lb. pressure capacity. The pressure is adjustable by means of a set screw at its front end.

An accumulator member is employed in the system. In it pressure is built up by means of the equalizing piston within the valve. This piston provides maintenance of an accumulator pressure always slightly less than that in the chucking cylinder. This pressure is used only for the purpose of operating the chucks at high speed. It may be noted that the pressure on the chucking cylinders always has the pressure of the pump backing up the chucks. The accumulator pressure is maintained at approximately 25 per cent under the cylinder pressure. Because of the intermittency of the use of accumulator pressure in chucking the sufficiency of pressure is assured without the employment of a large capacity pressure system and with a relatively small pump.

Patents have been granted and

others are pending on the combination system which provides lubrication of mechanical elements as follows:

Lubricating and Cutting Oil

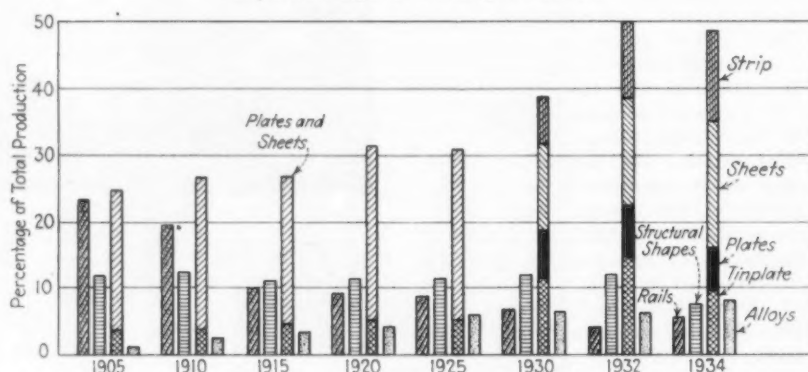
The surplus volume of oil from the accumulator is discharged into the top of the spindle carrier case where it sprays the spindle bearings and floods all shaft bearings. Exhaust oil from the chucking cylinder, returning through the hydraulic valve, lubricates the power case or unit. Overflow oil from the case runs to and lubricates the drawbar crosshead.

The machine base houses 100 gallons of cutting oil. A low pressure centrifugal pump is employed for delivery of a maximum capacity up to 50 gallons per minute to the cutting tools. Operator control of distribution is at hand for individual tools.

Controls

Automatic or hand controls are available throughout the machine and include a noteworthy electric feature whereby the functioning of each unit stops in the event of pressure failure below any predetermined point.

PRODUCTION OF RAILS, SHAPES, PLATES, SHEETS AND ALLOYS in percentage of total production



Several marked trends have developed during the past 30 years in the percentages of total production, occupied by certain types of steel output, according to the Iron and Steel Division, Bureau of Foreign and Domestic Commerce. Rails have steadily lost ground.

Structural shapes maintained their relative position up through 1933 but in 1934 dropped off sharply and represented the smallest percentage of total production since 1905.

Plates and sheets have grown steadily in importance through the years until in 1932 they represent approximately one-half of our total production. This, of course, reflects the growth of the automotive and metal container industries. Since 1929 sheet and strip steel have steadily increased their relative positions in spite of general adverse conditions.

The production of special alloy steels, in percentage of total steel production, has increased steadily through the years. In 1932, for the first time in history, we produced more tons of alloy steel than we did of rails, and last year more alloys than either rails or structural shapes.

Large accumulations of maintenance needs will undoubtedly increase the relative position of rails and structural materials in the near future, but the indications are clear that the industry must depend chiefly upon the expanding demands for sheet and strip steel and for special alloys.

Activities Bearing on Machine Tools Distribution

• • •

*A Department Conducted
by L. M. Waite*

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It may be worth while to recall, at this time, that the machine tool industry is not one of mass-production in the manufacture of its own products. It may be well to suggest, therefore, that machine delivery conditions in other post-depression periods, largely because of early restraints against order placing, quickly reached a point of delayed shipments and overtime shop-rush in the filling of orders. The records show this state of affairs to have been not only harassing but of unwholesome effect throughout the businesses of the purchaser, the distributor and the maker.

Reference to comparative potential demand is of no particular moment at this time. However, it is very much in order to suggest that those who have not already done so, refer to page 38—THE IRON AGE—March 28, where, under the news of the week, Frederick V. Geier, president of the Cincinnati Milling Machine Co., presents some very pertinent facts as to potential machine tool demand over a period of the next two years.

Indication of a possible repetition of past history is the fact that, during the past few months, there has been considerably more of machine tool order placing than has been revealed through the ordinary channels of information. Evidence supporting this statement has been well assembled and incoming reports continue to substantiate it. The subject will be dealt with more in detail at a later date.

Compared with stock-inventories of many other industries, few machine tools are ever carried in stock and the building and assembly of the mechanisms are relatively slow processes.

Those who respect past history and who seek to protect their profits by observing its lessons may be interested in a marked similarity between inquiry - conditions which exist now and those which have followed other depressions. Salesmen offering modern machine tools are very active on inquiries. Distributing machine tool organizations report that executive resistance to sales effort has been constantly lessening during the past few months and that formal inquiries have shown at least a 50 per cent increase over the same period of time.

Salesmen offering modern machine tools have had plenty of time and ample opportunity during the past year or so to become well informed as to new machine tool developments and their hand bags are well stocked with instructive data and with illustrations of new and perfected mechanical details. Forward looking executives can profitably spend some time with these men for the purpose of informing themselves on new routes, which cut out old detours, in meeting production demands.

Activity in Metal Washing

METAL washing, cleaning and drying machinery continues its increase in inquiries and orders. Anti-friction bearing plants in the Metropolitan and New England

areas and chain and roller-chain manufacturers in other areas are among other active purchasers.

As indicating a growing field of activity for this equipment, it is noted that the operators of a chain of English restaurants have ordered American metal washing equipment for the daily cleaning and drying of 300,000 small stamped steel "patty" plates.

A large producer of bakery products in the West has placed an order to insure that his metal pans shall be kept in a most cleanly condition.

An eastern manufacturer has decided to wash small standard castings in large quantities. A large gas company has arranged to strip the paint from meter rejects and meters which are to be recalibrated by this increasingly popular method of metal cleaning. Another manufacturer has ordered additional equipment for the 100 per cent removal of lapping compound from steel parts.

Government Specifications

THE production personnel at arsenals and navy yards is reported as devoting considerable time to new machine tool features and improved mechanisms which have been incorporated in a number of well known machines but which have not as yet been given much publicity. Specifications for a number of schedules are said to be held up for this purpose.

Among Machine Tool Dealers

DISTRIBUTION is not the only service rendered by machine tool dealers. Charles T. Bush, vice-president of the Chas. A. Strelinger Co., Detroit, has been devoting much time to committee work looking toward a revision of the Michigan state sales tax to give relief not only to dealers but to allied organizations doing business within the State of Michigan.

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Modern forming brakes, shears and sheet metal equipment in general are having very considerable order activity in the Metropolitan area. Much of the buying is by corporations having facilities for analyzing probable demand for their products.

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Small surface grinders are being called for. Among order reports from wide areas are late model machines to a very respectable total.

• • •

A prominent distributor, with wide territorial coverage through several offices, reports a consistently increasing monthly business over a period of the past three months. The larger part of the total volume has been from the relatively smaller shops.



Improvements in Production

Improved Swiss Jig-Borer Enters Field of Production Work

A COMBINED jig-borer and milling machine, "Hydrop-tic" size A, illustrated below, is built by Societe Genevoise D'Instruments de Physique, Geneva, Switzerland, and marketed in the United States by Triplex Machine Tool Corp., New York.

Widened utility and adaptability for production work without jigs and fixtures are attributed to improved features in the new machine. These are not common to the other machines in the line because of their more restricted utility.

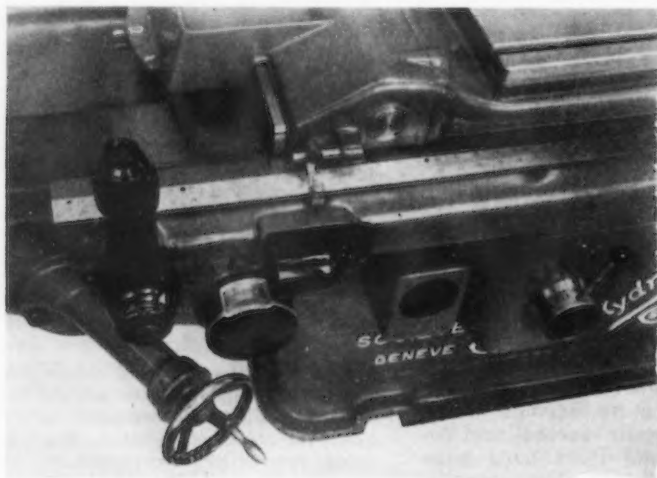
Entrance into the production

prismatic-type microscope and have built-in mountings in main castings. Through them, machine settings are characterized by extreme minuteness in division of split decimals. Both the scales and the microscope are so shielded from dirt and so protected against jar and shock that wear is said to be eliminated. The design eliminates necessity for correction-bar.

The table is hydraulically traversed and has speed variations ranging from 0.2 to 8 in. per min. Slow hand movement is provided for accurate setting purposes. The mechanism for hand-locking the table on the bed-ways is connected

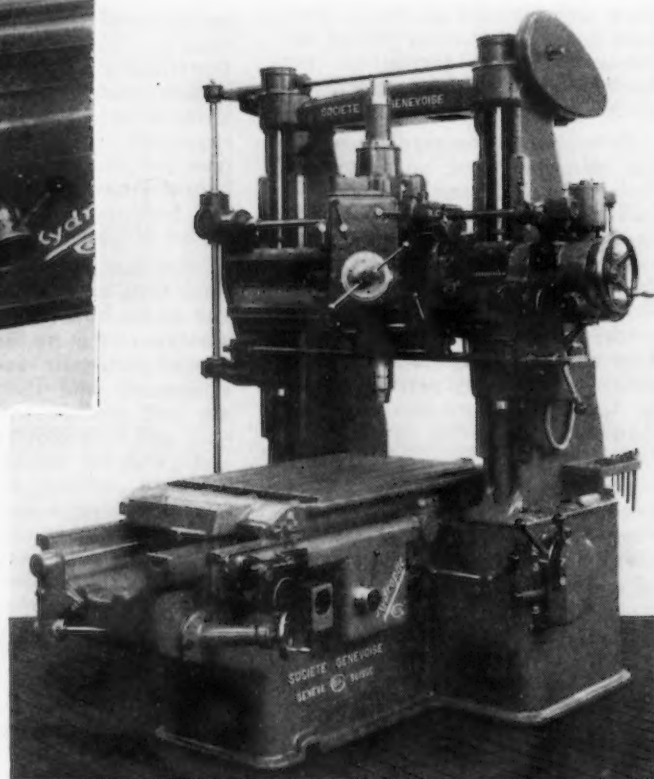
with a device for the releasing of hydraulic pressure. The spindle head has a 10-in. feed, operated by six power feeds up and six down, or by rapid or slow hand-feed.

There are 18 spindle speeds from 40 to 1250 r.p.m. Drilling range is from 0.1 to 1.75 in. Adjustable boring tools permit of diameter boring from 1/2 in. to 9 in. Adjustable automatic stops are provided. The positioning or removal of tools is by draw-in rod located at the spindle nose. Quick cross traverse of the spindle head is by rapid hand-feed while electrical power feed is employed during milling cuts. Both drives are always in mesh and necessity for any gear change or selection is avoided; for example, quick traverse from one boss to another by hand-wheel is immediately followed by electric power drive for stock removal through clutch engagement upon hand-wheel release.



field has made necessary very decided changes in the company's former jig-boring machine practice; for example, measuring lead-screws, common to the older borers, and unable to withstand the stresses of production milling, have been superseded by a standard precision scale for use with each, the spindle saddle and the table. These scales move with their respective mechanisms and are readable by

TABLE work-
ing surface
39 1/2 in. x
27 3/4 in. Dis-
tance between
uprights 35 1/2
in. Floorspace
93 in. x 108
in. Height 104
in. Longitudi-
nal travel of
table 37 in.
Transverse
travel of
spindle saddle
24 in.



and Shop Equipment . . .



All clamps are controlled from the operating side of the machine. The table is locked to the bed during boring operations. A single lever operates a two-point acting, self-compensating clamp which locks the spindle saddle on the cross-rail. A four-point acting clamp locks the cross-rail to the

uprights by single lever movement. The vertical movement of the cross-rail is electrically effected; the screws are entirely inclosed.

Oil is supplied to the cylinder by a geared pump which draws from a tank in the bed. Placing the pressure control lever in neutral position locks the piston rod hy-

draulically. At any time the lever is released it returns automatically to neutral position, thus effectively locking against any traverse through pressure against both sides of the piston. An adjustable dog on the lever sets any desired milling speed in connection with an automatic control valve.

New Cold Headers Employ Either Split-Die or Solid Die and Adapter

NATIONAL MACHINERY CO., Tiffin, Ohio, has announced a new line of open-die cold heading machines in single or double stroke, as illustrated below. The line is similar in many respects to the company's solid-die machines, but the addition of a relieving grip motion permits the operation of the new machines either as relieving-grip or as solid-die equipment. This provides flexibility in kind and range of work, all of which can be extruded during heading for roll threading.

Fig. 2 view of the die-box shows a machine set up with open or two-piece dies. In operation the

wire is fed through a shearing bush, cut-off, carried over, and pushed back into the die. At the time of heading the dies are rigidly held together by the gripping

THE combination utility of this new machine line follows the design trend for increased range-flexibility in production work.

mechanism, but as soon as the heading is completed and before the kicking starts, the grip is slightly relieved, and regardless of its length, the blank is easily ejected from the dies. The grip mechanism is toggle-operated and protected by an automatic relief. To produce different lengths of blanks within the same die it is only necessary to change the stroke

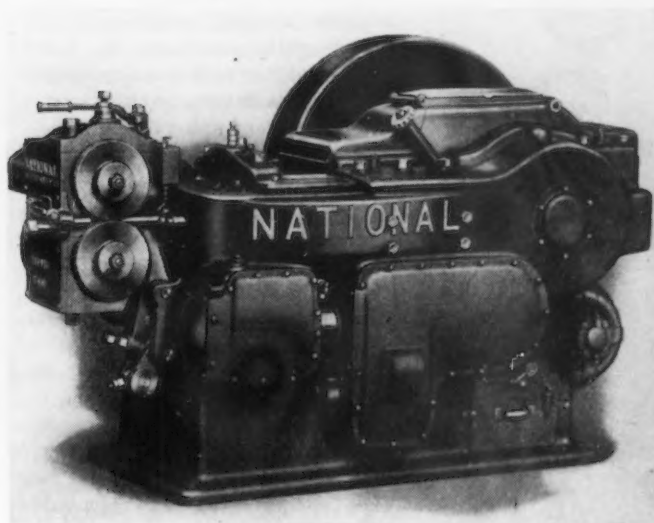


FIG. 1

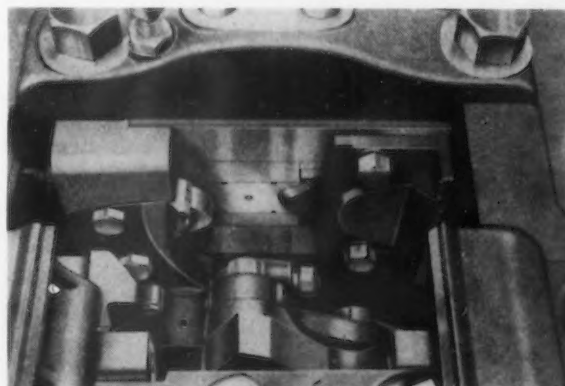


FIG. 2

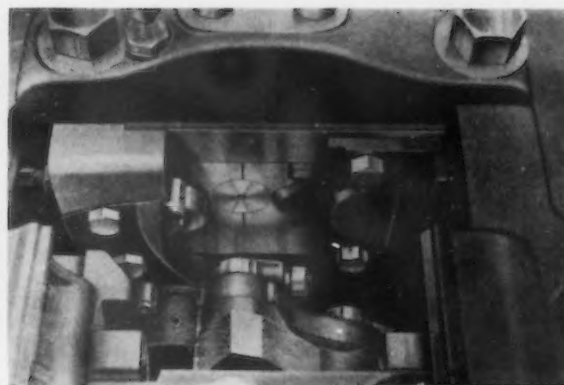


FIG. 3

of the wire feed and to adjust the position of the knock-out pin. This allows a wider use of two-piece or split-dies which can be ground, and thus effect a gain in the amount of die steel used up in productive operation.

Fig. 3 is a view into the die-box illustrating that, by means of an adapter, regular solid dies can be used. With the use of solid dies the grip is locked in the closed position so that the die is rigidly held in alinement. This is accomplished by a locking screw located at the top of the machine. Also, the machine may be operated with solid clamped split-dies. In this way split-dies can be used on extremely long work with the machine operating as a solid-die header, and in the event of ejection trouble being encountered it is quickly eliminated by opening the grip-actuating screw which relieves the pressure on the work before ejection takes place. The extrusion bush is gripped and held in alinement with the dies, and when the gripping pressure is relieved the bush is free and the blank can be ejected without any cramping tendency. This feature is patented.

Other design characteristics common to previous models are retained; these include short steel bed frame, long over-arm heading slide, oscillating cut-off, rocker heading tool movement, angling feed, automatic lubrication, etc.

Cushioned Couplings In Three Materials

FLEXIBLE couplings, having individual free-floating load cushions hung between jaws on removable studs, for shaft diameters from 3 to 10 in. are announced by Lovejoy Tool Works, Chicago.

The cushion material is of three specifications. 1—Metalflex—a brake-lining material used for heavy shock-loads as on excavating machinery, steel-mill equipment, and where exposed to extreme weather. 2—Leather load cushions—of oak-tanned belting leather for use on sustained loads and greater misalignment. 3—Multiflex cushions—a rubber-duck fabric, vulcanized under pressure for use on fluctuating loads and where high resiliency is required.

The loads cushions are in plain sight for inspection at all times

and can be easily removed and replaced. There is no wear on the iron or steel jaws and no lubrication is required.

In operation, one-half of the cushions are idlers, except on reversing load; hence there is always a set of new cushions in the coupling. This feature eliminates shut-downs, as load cushions can be easily and quickly interchanged without tearing down the coupling.

This principle of carrying the load on these free-floating load cushions is said to have been thoroughly tested for six years.

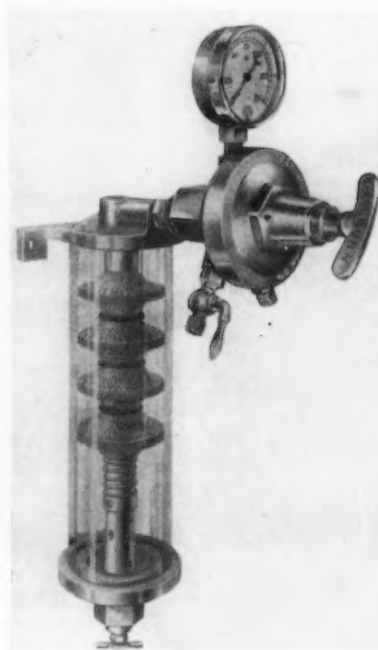
Practical Purifier For Air and Gas

A PRACTICAL purifier for conditioning air or gas has been announced by the Alexander Milburn Co., Baltimore, Md. The assembly is shown below.

The purifier has a glass shell through which any accumulated oil, moisture or dirt can be readily seen, enabling the user to quickly determine when cleaning is necessary.

A series of perforated plates and strainers remove foreign substances from air or gas lines, ensuring at all times a clean, moisture-free flow for paint spraying, welding or any other similar operations.

The equipment is useful in spraying work where the air to

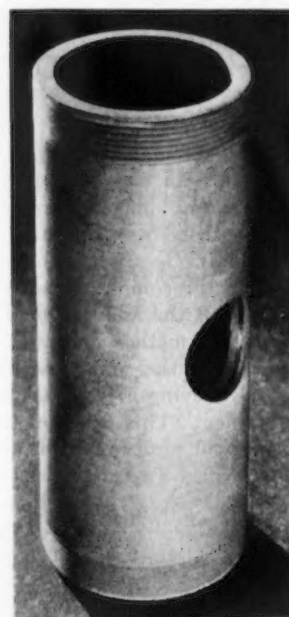


the spray gun must be conditioned dry and clean at all times to prevent spotting of work.

The equipment has few parts and can quickly and easily be disassembled for cleaning. A 3-in. diaphragm regulator having a graduated gage is standard equipment.

X-Ray Shield Utilizes Bakelite Laminated

A NEW X-ray shield of Bakelite laminated has been developed by Joseph C. Rah & Co., Chicago. This shield, illustrated below, is designed for portable shock-proof X-ray equipment for industrial purposes, such as X-raying castings and joints. Bakelite laminated



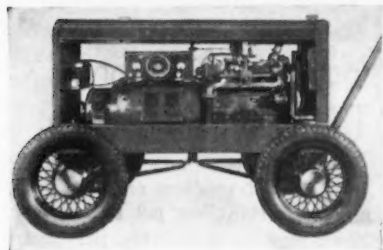
acts as a good insulator at the 75,000 volts necessary in X-ray work, and it is said remains opaque to X-ray radiation, particularly in the vicinity of the target.

This shield is made by wrapping a Bakelite laminated tube on a mandrel and curing it hard enough to permit machining. A groove is then cut into it and lead foil of the proper thickness is rolled in. The thickness of the lead depends upon the penetrating powers of X-rays. Additional varnish-impregnated paper is wrapped on the top of the first one, which contains the lead strip, and the whole shield is cured properly. Tests show this tube opaque to X-rays generated by 125,000 volts and resistant to a flashover of 130,000 volts.

New Model Arc Welders. Are Gas Engine Driven

MODEL HF, gasoline-engine-driven, arc welders are announced by Hobart Brothers Co., Troy, Ohio. Improved engines with six or eight cylinders are used. The equipment is presented in this column.

Startix equipment with automatic choke and downdraft carburetor eliminates hand cranking, and makes it unnecessary to even press a starting lever or pull a choke wire. The Startix goes into operation as soon as the ignition switch is turned on and it automatically cuts out when the engine starts. The automatic choke is thermostatically controlled. Calibrated ignition with vacuum controlled distributor insures maxi-



mum economy with freedom from "ping" when using ordinary commercial gasoline. A special generator supplies ample current to keep the storage battery charged, even when used for lights on the job. Air, oil and gas filters are standard equipment. Special attention has been paid to cooling so that all cylinders are equally and efficiently cooled. The 200 and 300-amp. sizes are equipped with six-cylinder engine, while the 400-amp. size is equipped with a heavy-duty, eight-cylinder industrial engine. Variable speed adjustment makes it possible for the operator to select the most suitable and economical engine speed for each job, at any point from 1000 to 1800 r.p.m., full rated capacity being available at 1500 r.p.m.

All models may be had for either stationary or portable use, with shop type or yard type steel wheels, or may be mounted on an improved Hobart road trailer with wire wheels, pneumatic tires, radius rods and stabilizer.

Indoor Cooling Towers Built in Eight Sizes

BINKS MFG. CO., Chicago, has placed on the market a complete line of indoor forced draft cooling towers. The design is shown below.

Eight sizes are available, ranging in capacity from 5 to 50 gal. per min., for the cooling of condensing and circulating water of refrigeration and industrial equipment and processes. The tower housing is constructed of a heavy-gage galvanized copper-bearing steel material. Interior air deflectors insure uniform air distribution through the tower from the fan unit. The fan is of a modified design made entirely of aluminum alloy. Warm water is delivered to the tower from the condenser or other process to a system of patented "Rotojet" clog-proof nozzels, suitably arranged to provide maximum water break-up and distribution under low water pressure.

The two smallest sizes, 5 and 10 gal. per min. capacity, are furnished as a complete self-contained unit. The larger sizes are made up in sections and are conveniently assembled on the job. All sizes are furnished complete with fan and fan motor, together with water circulating pump where desired, and can be arranged for automatic

operation. The finished units are sprayed with two coats of aluminum protective paint.

Lifting Magnets for Moderate Load Uses

LIFTING magnets, 25-in. diameter for use with smaller capacity cranes of the monorail and crawler, gasoline or electrically operated, type are announced by the Electric Controller & Mfg. Co., Cleveland.

New design features water-tight construction, both top and bottom; a heavily ribbed magnet case, and a durable magnet of pronounced heat radiating capacity.

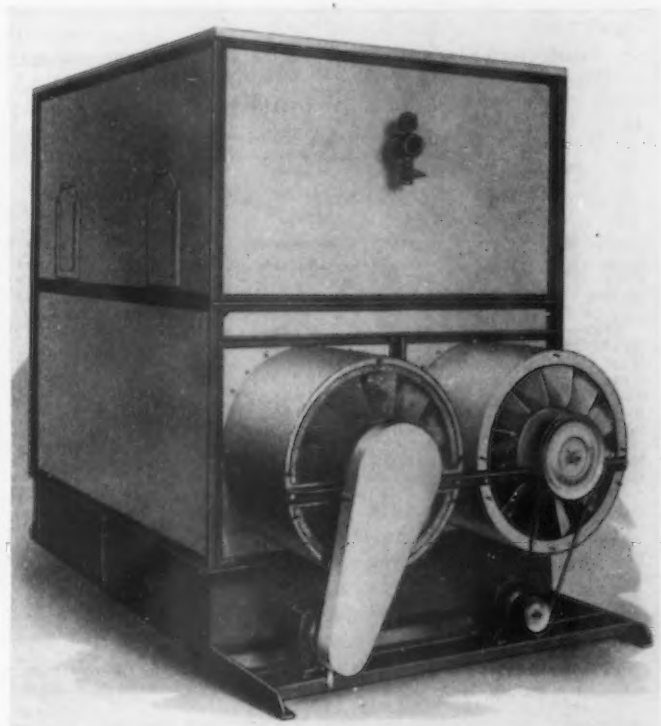
The coil is insulated from the spool and after winding, is impregnated with the moisture-repelling compound. It is welded within the case at the inner and outer circumferences of the bottom plate, and the magnet filled with compound to the top of the terminal block.

Standard equipment includes two heavy protected connecting cables and two rubber covered cable connectors; also a No. 00 automatic discharge magnet controller consisting of a small, two-position master switch and a steel safety cabinet containing the contactors and resistors.

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THESE complete units for indoor industrial cooling installations are designed to meet both cooling requirements and available space.

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NEWS OF THE WEEK

March Steel Producing Rate Only 4.7 Per Cent Under February — Total Output Up

PRODUCTION of Bessemer and open-hearth steel ingots during March rose to 2,830,700 gross tons from 2,742,125 tons in February, according to the American Iron and Steel Institute. Because of the two extra working days last month, daily production at 108,873

tons was 4.7 per cent below the February rate of 114,255 tons daily. The industry's potential capacity was engaged at 49.18 per cent during March, compared with 51.61 per cent in February.

In the first quarter this year steel ingot production was 8,406,-

995 tons, averaging 109,182 tons daily, compared with 6,915,785 tons or 88,664 tons daily in the first quarter of last year. The corresponding percentage rates were 49.32 and 40.27 respectively.

Industrial Relations Thoroughly Studied

ONE of the most complete studies of modern employee-management relations yet to appear is contained in a volume just issued by the University of Pennsylvania Press, Philadelphia, entitled "Executive Guidance of Industrial Relations." The author, C. Canby Balderston, is research associate in the industrial research department and professor of industry in the Wharton School of Finance and Commerce and a well known figure in management circles.

The book analyzes the industrial relations experiences of 25 companies, four of which were recently awarded prizes for having demonstrated the soundest worker-management relations. First prize in this contest went to the Leeds & Northrup Co., Philadelphia, and other winners were the General Electric Co., Schenectady, N. Y.; the Westinghouse Electric & Mfg. Co., East Pittsburgh, and the Procter & Gamble Co., Cincinnati. Other companies whose industrial relations programs were studied and are discussed in the book are the American Rolling Mill Co., Middletown, Ohio; the Ilg Electric Ventilating Co., Chicago; the Kohler Co., Kohler, Wis., and the Studebaker Corp., South Bend, Ind.

MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Gross Tons)

Reported by Companies Which Made 99.32 Per Cent of Open-Hearth and 100 Per Cent of Bessemer Ingot Production in 1933

1934	Open-Hearth	Bessemer	Calculated Output All Companies		No. of Working Days	Per Cent Operation†
			Monthly	Daily		
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
Three months ..	6,320,248	552,266	6,915,785*	88,664*	78	40.27*
April	2,622,372	257,482	2,897,529*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	115,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
August	1,245,445	109,598	1,363,359	50,495	27	22.93
September	1,126,415	117,580	1,251,630	50,065	25	22.74
October	1,325,225	127,789	1,461,932	54,146	27	24.59
November	1,447,297	132,059	1,589,049	67,117	26	27.76
December	1,797,830	131,456	1,941,127	77,645	25	35.26
Total 1935	22,944,171	2,162,311	25,260,570	81,224	311	36.89
January	2,576,671	239,858	2,834,170	104,969	27	47.42
February	2,500,062	224,336	2,742,125	114,255	24	51.61
March	2,582,211	230,810	2,830,700	108,873	26	49.18
Three months ..	7,658,944	695,004	8,406,995	109,182	77	49.32

*Revised.

†The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

Steel Consumption of Eight Industries Down 67,000,000 Tons in Five Years

MAJOR industries used about 67,000,000 less tons of steel in the five years from 1930 through 1934 than they did in the five years from 1925 through 1929, according to estimates by the American Iron and Steel Institute. Such a tonnage represents 17 months' production for the steel industry if operated at 100 per cent of present capacity.

Approximately 59,000,000 tons of finished steel has been consumed since 1930 by the construction, railroad, automotive, oil, gas, mining, agriculture and machinery industries. From 1925 through 1929, these industries required an estimated aggregate of 126,000,000 tons.

Total consumption of steel by the railroads during the past five years has been 67 per cent below the tonnage taken by them from 1925 through 1929; while the tonnage of steel used for construction since 1930 has dropped 53 per cent. Since the slump in consumption, begun in 1930, the tonnage of steel used for oil, gas, mining and farm equipment and for machinery has averaged about 50

per cent of the predepression requirements of those industries.

Consumption of steel by the automobile industry, however, has fallen only 40 per cent, between the two five-year periods, while consumption of tin plate for containers since 1930 is estimated to have been 7 per cent above the tonnage used for that purpose during the five years 1925-1929.

A chart of the yearly production of steel ingots since 1900 recently prepared by the institute shows that production of 25,263,569 gross tons in 1934, in spite of the improvement over 1933 and 1932, is still only up to the level of 1910, and is far beneath the average of production from 1922 through 1929.

The institute's chart shows that since 1900 every drop in the tonnage curve until 1930 has been quite promptly followed by new high levels of production. The chart further reveals that over the whole period of 35 years only in two years (1900 and 1901) was production below the total of 13,322,833 gross tons produced in 1932, steel's worst year.

Foundrymen Announce Convention Plans

THE American Foundrymen's Association will hold its 1935 convention Aug. 19 to 23 inclusive at Toronto, Canada. There will be no equipment exhibit and the meeting will be confined entirely to technical papers, shop courses, round table discussions, committee meetings, plant visits, and numerous social functions, all of which have previously been so popular with association members.

The first day of the convention will be devoted to committee meetings and registration. Technical sessions will follow the general opening on Tuesday morning, and will continue through Friday noon. While the technical program will include papers and reports covering most recent developments in the art of castings production, it is planned to have fewer sessions than in past years. Thus more time will be provided for informal group meetings, plant inspection, and visits to points of interest in and around Toronto.

The closing of the convention on Friday noon will coincide with the opening of the Canadian National Exposition, an internationally known fair held each summer. A committee of Canadian foundrymen, headed by L. L. Anthes, Anthes Foundry, Ltd., Toronto, will cooperate with the American association in handling the details of the convention.

Analyzes Effects Of 30-hr Week

NO stimulus to business recovery and no increase in the purchasing power of wages would result from the adoption of the 30-hr. week, according to the National Industrial Conference Board. In its new analysis of the 30-hr. week just published in pamphlet form, the board points out that by producing a slight gain in employment, the 30-hr. week might increase the volume of money in circulation. It would not, however, increase the ability of workers to purchase goods because there would be no rise in real wages.

If, at the present time, the board illustrates, 1000 persons were able to buy a total of 10,000 units of goods for \$100,000, after the adoption of the 30-hr. week 1100 persons would be able to purchase the same amount of goods for \$110,000. More money would thus be put in circulation, but there would be no increase in the demand for goods. There would be no stimulus to business revival, because there would be no increase in the purchasing power of payrolls.

The board explains that the situation would be different if it were possible under the 30-hr. week to increase the per unit output per man and to decrease the per unit cost of goods. If this were done, purchasing power would be increased and an additional demand for goods would be created.

The effect of the 30-hr. week, according to the board, would be exactly the opposite. It would decrease the output per man and increase the per unit cost of goods. It would, therefore, result in a lower real wage, less production, and a lower standard of living.

Metals Group Names Officers for 1935

THE Cleveland chapter of the American Society for Metals has elected the following officers for the ensuing year: Chairman, H. B. Pulsifer, chief metallurgist, Ferry Cap & Set Screw Co.; vice-chairman, Harry P. Croft, metallurgist, Chase Brass & Copper Co.; secretary and treasurer, G. T. Williams, metallurgist, Cleveland Tractor Co.; executive committee, A. A. Bates, Case School of Applied Science; A. H. Allen, Penton Publishing Co.; J. C. Beattie, Fulton Foundry & Machine Co.; G. C. Beebe, Columbia Tool Steel Co.; H. E. Brown, W. S. Tyler Co.; E. F. Burke, C. I. Hayes, Inc.; H. D. Churchill, Case School of Applied Science; H. B. Jordan, American Steel & Wire Co., and A. M. Thurston, East Ohio Gas Co. E. F. Ross, retiring chairman, is ex-officio member of the committee.

The twenty-eighth annual edition of "Metal Statistics" has been issued by the American Metal Market, 111 John Street, New York. This book includes a record of production, consumption, imports, exports, stocks, price fluctuations and averages (monthly and annually), applying to finished and semi-finished ferrous and non-ferrous metal products as well as raw materials.

British Rail and Structural Mills Busy—Tin Plate Demand Improved

LONDON, Eng., April 8.—Pig iron is steady, but forward buying is disappointing. Hematite home consumption is heavy, but exports are light.

Variable conditions persist in finished steel, and few works are booked far ahead. Shipbuilders' specifications and export orders for sheets are scarce, while makers of rails and structural steel are busy. Exports are slightly better and tubes are apparently unaffected by the international cartel's collapse. Tin plate is quiet but the firmer tin market is bringing out better inquiry, especially from home consumers. Present output is at about 50 per cent of capacity and likely will be maintained until other member countries of the international agreement complete their quotas.

Continental iron and steel mar-

kets are more active, particularly domestic demand, while export demand still is overshadowed by pending cartel negotiations. Good demand for semi-finished merchant bars and ship plate is reported. A meeting of English steel makers with the International Raw Steel Cartel regarding English membership is scheduled for April 16. The Paris negotiations on the Saar question reached a complete agreement whereby Germany and France grant each other mutual import quotas of 50,000 tons and Germany received additional export quotas on certain products for Saar production. The agreement is regarded as proof that the cartel is not endangered by recent events.

Objects to Federal Industrial Restriction

"BELIEVE America will be best served if its industry is organized in the future as it has been generally in the past, for the production of the maximum quantity of goods and services under the competitive system. Anything that stands in the way of this general objective should be eliminated or subordinated to it." Thus spoke George H. Houston, president, Baldwin Locomotive Works, Philadelphia, and chairman of the Durable Goods Committee, in a recent address before the business and professional men's group, at the University of Cincinnati.

"The first of these factors which are interfering with industrial recovery and one that underlies our whole national thought at this time, is the generally accepted opinion that it is proper and desirable to use industry as a vehicle for effecting certain far-reaching reforms in our social organization with little regard to what this may do to industry's ability and opportunity to produce," he continued.

"Every form of industrial activity, in every part of the country, is being burdened today with a great mass of extraneous duties having little, if anything, to do with production—to such an extent, in fact, that the people as a whole are losing sight of the real purpose of industry, and are looking upon it as a God-given facility for solving all their social problems.

"How can employment be re-

stored in these heavy industries? Is it by freezing rigidly, fixed maximum hours of work at levels so low that, to permit a man to earn a living wage, costs must be established at levels equal to or above those of 1929; or shall it be by the restoration of such flexibility in these working conditions as will permit industry to produce and sell its products at prices that will create a demand for them and thereby create employment?"

Offers Books on Making of Steel

THE "Physical Chemistry of Steel Making," a collection of reports covering the experiments of C. H. Herty, Jr., and associates, is now being offered in book form by the Metallurgical Advisory Board to the Carnegie Institute of Technology, Pittsburgh. The experiments included a study of the refining of steel in open-hearth furnaces with a special emphasis on the control of the oxides in slag and the relationship between slag oxidation and metal oxidation, strong deoxidizers, elimination of non-metallic matter, gases in steel, quicker methods of determining inclusions, the influence of these inclusions on the physical properties of the finished steel, and numerous other allied problems.

The individual reports are entitled the "Effect of Deoxidation on the Rate of Ferrite Formation in Plain Carbon Steels," the "Effect of Deoxidation on Grain Size and Grain Growth in Plain Carbon Steels," the "Effect of Deoxidation on the Aging of Mild Steels," the "Effect of Deoxidation on the Impact Strength of Carbon Steels at Low Temperature" and the "Control of Iron Oxide in the Basic Open-Hearth," and there is a general bulletin on the deoxidation of steel.

A supplementary book giving a bibliography of non-metallic inclusions in iron and steel is also offered by the advisory board. Thousands of references in the whole field of ferrous metallurgy pertaining to inclusions are included in this book.

A hydraulic structural testing machine, 40 ft. high, weighing 45 tons and occupying four stories, has been acquired by the engineering laboratories at Columbia University, New York. Capacity is for specimens up to 6 ft. wide, 20 ft. high and of any shape, which is more than twice the capacity of the previous machine of its type at the Columbia laboratories.

British Prices, f.o.b. United Kingdom Ports Per Gross Ton

Ferromanganese, export	\$9	
Billets, open-hearth	\$5 10s.	to \$5 15s.
Tin plate, per base box	*18s.	2d. to 19s.
Steel bars, open-hearth	\$7 17½s.	
Beams, open-hearth	\$7 7½s.	
Channels, open-hearth	\$7 12½s.	
Angles, open-hearth	\$7 7½s.	
Black sheets, No. 24 gage	\$9 5s.	
Galvanized sheets, No. 24 gage	\$11 5s.	

*To June 1; 18s. 5d. to 19s. 3d. thereafter.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	\$2 7s.	
Wire rods, No. 5	\$4 10s.	
Steel bars, merchant	\$3 5s.	
Sheet bars	\$2 8s.	
Plate, ¼ in. and up	\$4	
Plate, 3/16 in. and 5 mm.	\$4 2s.	6d.
Sheets, ½ in.	\$4 7s.	6d.
Beams, Thomas	\$3 2s.	6d.
Angles (Basic)	\$3 2s.	6d.
Hoops and strip base	\$4 2s.	6d.
Wire, plain, No. 8	\$5 7s.	6d.
Wire nails	\$5 15s.	
Wire, barbed, 4-pt. No. 10	\$8 15s.	

PERSONALS

ALFRED K. MARTIN has been appointed vice-president, director and chief engineer of the Forging & Casting Corp., Ferndale, Mich., and is severing his direct connection with the Ludlum Steel Co. of which he has been vice-president for the last five years. Common stock control of the Forging & Casting Corp. is held by the Ludlum Steel Co. Mr. Martin's experience and association with Ludlum date back to 1909 when, after graduating from Rensselaer Polytechnic Institute with the degrees of Civil Engineer and Bachelor of Science, he was employed as a chemist by the small Ludlum organization which had only recently (in 1907) located at Watervliet. Through the positions of assistant superintendent, superintendent of rolling mills, chief engineer, general superintendent and vice-president in charge of research and development, his progress was contemporaneous with that of his company. When Ludlum decided to abandon the crucible process and pioneer in the all-electric-furnace method of manufacture for both tool steels and corrosion and wear resisting steels, Mr. Martin participated in the Ludlum organization's designing and building of its own electric furnace, a two-phase, box-type furnace, and later in the development from the original two-phase to the present design.

WILLIAM C. MORELAND, vice-president, Jones & McLaughlin Steel Corp., Pittsburgh, celebrated his fiftieth anniversary with the company on April 4. He entered the employ of the Jones &

Laughlin company on April 4, 1885, as a telegraph operator, and successfully filled many positions until he was appointed auditor, in February, 1899. In June, 1900, he was elected secretary, and a member of the board of managers of Jones & Laughlin, Ltd. Mr. Moreland is also a director and a member of the executive committee of the company.

WILLIAM H. JESS has been appointed assistant to JOHN C. LONG, manager of publications, Bethlehem Steel Co., effective immediately, according to announcement made by the company this week. The publications department at Bethlehem includes the publishing, news, and advertising activities. Mr. Jess' title will be assistant manager of publications. He has been chief of the advertising copy staff, and has had 11 years of service with Bethlehem. He is a graduate of the University of Pennsylvania (M.E.), and served on the editorial staff of the Philadelphia *Evening Bulletin*. Prior to coming to Bethlehem, he had handled the advertising for the McGraw-Hill Book Co., and subsequently for the Samuel M. Langston Co.

CARL O. HEDNER, manager of hoisting equipment sales, Yale & Towne Mfg. Co., Philadelphia, has been elected chairman of the Electric Hoist Manufacturers Association, succeeding FRANK F. SEAMAN, general manager, hoist and crane division, Robbins & Myers, Inc., Springfield, Ohio. CHARLES A. MOORE, chairman, Manning,

Maxwell & Moore, has been named vice-chairman. Shaw-Box Crane & Hoist Co., Inc., a member of the association, is a subsidiary of Manning, Maxwell & Moore.

JOHN R. POYSER has resumed his duties as sales manager, Doelger & Kirsten, Inc., Milwaukee, with whom he was formerly associated in a similar capacity for 10 years.



W. E. BARNES, who, as announced in these columns last week, has been appointed assistant to the vice-president in charge of sales of Lukens Steel Co.

CHARLES L. FAUST has been named electro chemist on the technical staff of the Battelle Memorial Institute, Columbus, Ohio. Dr. Faust is a graduate of Washington University and received his Ph.D. degree in chemical engineering in June, 1934, from the University of Minnesota, having specialized in electrodeposition of alloys.

DR. H. R. NELSON has been added to the technical staff of the Battelle Memorial Institute of scientific and industrial research, Columbus, Ohio. At the Battelle laboratories Dr. Nelson will be in charge of a research project consisting of a study of the application of electron-diffraction methods to metallurgical problems. This new field of activity offers many possibilities of practical application.

A. W. HOWE, president, J. M. & L. A. Osborn Co., Cleveland, has been elected a director of the Sharon Steel Hoop Co., Sharon, Pa.

L. V. REESE, who has been handling rural industrial communities



A. K. MARTIN



W. C. MORELAND



W. H. JESS

in the rural rehabilitation program of the Federal Emergency Relief Administration, has resigned to become assistant secretary of the American Engineering Council, Washington. He has also served the FERA as executive secretary of the District of Columbia Rehabilitation Corp., and as planning engineer for the Texas Relief Commission.

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A. E. MILBRATH, heretofore chief draftsman of the Mathews Conveyer Co., Ellwood City, Pa., has been appointed plant superintendent, succeeding the late C. A. Adams. LEE SEKULSKI will relinquish his position as assistant chief engineer to become sales manager, replacing W. L. DEAN. Mr. Dean continues as secretary-treasurer of the company.

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RAY L. HOWES has been appointed field manager of the recently created eastern oil power division of the Worthington Pump & Machinery Corp., and will maintain his headquarters at 2 Park Avenue, New York. Mr. Howes is widely known in the Diesel engine world and has had extensive experience in its various fields of application. For the past 22 years, he had been connected with the Diesel sales division, Fairbanks, Morse & Co., at St. Louis and Chicago. Through the Worthington corporation's field

organization in the territories of the district offices of Boston, New York, Philadelphia, Washington and Atlanta, Mr. Howes will have supervision of Diesel engine sales in these office territories.

Gear Makers Complete Meeting Program

INSPECTION methods, heat treatment and finishing of gears are among the technical topics planned for the annual meeting of the American Gear Manufacturers Association, to be held May 14 and 15 at the Penn-Lincoln Hotel, Wilkinsburg, Pa. B. F. Waterman, engineer, Brown & Sharpe Mfg. Co., and honorary president of the association, announces the following papers:

Methods for Checking Gears, by D. T. Hamilton, engineer, Fellows Gear Shaper Co., in collaboration with Robert Beardsley, Jones & Lamson Machine Co.

Inspection Methods That Give a New Conception of Gear Accuracy, by S. O. Bjornberg, Illinois Tool Works.

Heat Treatment of Miscellaneous Gearing, by Jordan Korp, Leeds & Northrup Co.

New Machine for Finishing Gears by Rotary Shaving Process, by R. S. Drummond, National Broach & Machine Co.

Science of Seeing, by a represen-

tative of the General Electric Co.

British Standards—with particular reference to worm gears, by Prof. Earle Buckingham, Massachusetts Institute of Technology.

British Standards—with particular reference to bevel and spiral-bevel gears, by F. E. McMullen, Gleason Works.

A session devoted to a report of the industry's code authority will include an address by an official identified with the NRA at Washington from its beginning. Addresses at other sessions will include one by J. H. Van Deventer, editor of THE IRON AGE.

J. C. McQuiston, Penn-Lincoln Hotel, Wilkinsburg, Pa., is manager-secretary of the association.

Refrigeration and Washing Machine Makers Busy

FRIGIDAIRE Division of General Motors Corp., Dayton, Ohio, shipped 51,277 household refrigerators, commercial refrigeration units and air conditioners last month, shattering all previous March records. On Friday, March 29, all daily shipping records since 1929 were broken with the dispatching of 103 carloads from the Frigidaire factories.

The washing machine industry also is in an active production season. A leading maker of electric washing machines for household use entered April with unfilled orders on its books for a full month's output. On Monday, April 1, it received the largest volume of orders for a single day in its history.

Editor's Note: This is a series of observations which, strangely enough, are exactly what they purport to be. In other words, they come from the daily diary of a real boss; a prominent executive in the metal-working industry who prefers to remain an anonymous author.

The Boss's Diary

Well, I've been to Washington and had me a talk with two senators and two representatives. All of them were elected by the party now riding in the Band Wagon. Two of them are sound and experienced legislators. The other two aren't exactly red but one of them is a bit of coral pink and the other a sort of fresh, painful sunburn in political theory.

I wonder why this visit to Washington has brought back to mind a comment I heard a while back on Columbus. Eminent explorer and discoverer that he was, when he set out across the luring waves he didn't know where he was going, when he struck terra firma he didn't know where he was at and when he got back he didn't know where he had been.

Detroit Purchasers Are Buying Further Ahead

THE buying policy of Detroit industrial firms still shows confidence in the future, according to the monthly survey of the Purchasing Agents Association of Detroit. Thirty-nine per cent of the reporting companies are buying for three months in advance, 14 per cent for two months, 12 per cent for one month, nine per cent for six months and 16 per cent continue on a hand-to-mouth basis. Ten per cent are committed to no definite policy. Commodity prices and inventories are slightly higher and collections and credit slightly better than they were a month ago. Fifty-nine per cent of the companies reported no increase in business during March, as against February.



THIS WEEK IN WASHINGTON

State Department takes more realistic attitude toward tariff discrimination by importing countries.

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NRA finally faces Supreme Court test. Decision may come before expiration of recovery act.

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Opposition to Wagner bill may succeed in defeating measure.

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Steel code severely criticized by attorney for Ames company.

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Emergency freight rates likely to become effective April 18.

BY L. W. MOFFETT

*Resident Washington Editor,
The Iron Age*

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WASHINGTON, April 9.—Remove discriminations against the United States or the trade is off. . . . Such is the realistic policy just officially adopted by the Administration in negotiating reciprocal trade agreements. . . . Fallacious though the principle of tariff bargaining is believed, by a vast section of American industry, to be for a high cost country like the United States, there will be general agreement that the policy barring discrimination is sensible and will be effective if it is actually applied. . . . In proclaiming the American-Belgian treaty, President Roosevelt served sharp notice that concessions by the United States will be granted to other countries under the most-favored-nation treatment policy only when other countries accord like treatment to the United States. . . . This practical policy, which, no doubt, was inspired by Secretary of State Cordell Hull, is a shift from the former traditional policy, seldom enforced, of imposing additional duties on countries which had discriminated against the United States. . . .

It strikes also against the idea of so-called bilateral pacts. . . . Rejecting this scheme, the State Department said it implies the desire to bring about "a balance of trade between each pair of

countries and leads to the impairment or destruction of multilateral trade based upon an economical and mutually advantageous international division of production." . . . The State Department, in rejecting the policy of what it terms "the absolute height of trade barriers," finds it to be so complicated by industrial and historical considerations that definite conclusions would necessarily have to be of an arbitrary character. . . . In order therefore to resist discriminations against American exporters, the United States now says it will deny duty concessions to those countries which discriminate against it. . . . Forms of discriminations are discussed in the State Department's announcement of policy and include such means as unfair quotas, exchange regulations, high tariffs. . . .

To this end the proclamation issued in connection with the Belgian treaty groups countries of the

world under three classifications. . . . The first two groups are found to discriminate against the United States and according to the severity of the discriminations they are in effect given time within which to remove the discriminations. . . . Unless they are removed within the periods named the United States will withdraw from them concessions granted under the Belgian treaty. . . . Canada, the Netherlands, Spain, Switzerland and Liechtenstein come within the six months' group. . . . Denmark, Germany, Italy, and Portugal come within the 30-day group, meaning, for example, that unless Germany removes discriminations against the United States within 30 days after the Belgian treaty becomes effective, German steel imported into the United States will, instead of being granted concessions provided in the treaty, continue to be assessed the present duties. . . . France already has been told to

remove discriminations or be denied the American concessions. . . .

The third group of countries, some of which are held to discriminate "slightly" against the United States, makes up a total of 63, which are to receive the benefit of the proclaimed duties, efforts to be made meanwhile to negotiate treaties that will do away with even "slight" discriminations. . . . In this latter group is Soviet Russia, with which the United States recently broke off debt negotiations. . . . It is understood, however, that Russia, heretofore reported to have been denied any concessions made in treaties with other countries, will not be given the lowered manganese ore duty granted Brazil in the treaty made with the latter country but not yet proclaimed. . . . The refusal to grant the lower manganese duty—0.5c. a lb., contained manganese—to Russia was said to be based on "a special consideration," the character of which has not been disclosed. . . . Among new treaties being negotiated is one with Sweden, and American tool steel makers are showing concern as to whether it will involve a lowering of the American tariff on tool steel. . . .

While Senator Tydings, Democrat, of Maryland, was lambasting Administration alphabetical agencies (AAA) as monstrosities, and challenging their validity, New Dealers were made gleeful by the decision of the Circuit Court of Appeals at New York in the Schechter poultry case upholding NRA on 17 out of 19 counts. . . . Plans were immediately started to expedite the case before the Supreme Court. . . . After the many lacings NRA has been given by lower courts, the decision was manna from heaven to the Administration forces. . . . Donald R. Richberg, acting NRA chairman, said the Schechter case was the most important NRA opinion ever handed down, rated it as being 10 times as important as the abandoned Belcher lumber case, called by anti-New Dealers as the welcher case, which the Government withdrew just as it was to be tested in the Supreme Court, not because of fear of the constitutionality of NRA, said the Department of Justice, but because the lumber code has some "defective provisions" which cannot be justified. . . .

The Department of Justice hopes to argue the Schechter case early in May and Mr. Richberg is hopeful that a decision can be reached in time for Congress to act on extension of NRA. . . . It is interesting to note, however, that even in the Schechter case the court upheld the defendants on the two counts as to the constitutionality

of the NRA in fixing wages and hours, a decidedly important exception. . . . However, Mr. Richberg met this point. . . . He said "the Federal authority to regulate wages and hours in purely intrastate operations depends upon the degree of necessity for such regulation in order to exercise effectively the Federal power of regulating interstate commerce. Only by a series of decisions can all of the problems involved in codes of fair competition be judicially determined. It is clear, however, that if the reasoning of the court is followed carefully in the formulation of codes, minimum wages and maximum hours can be legally enforced for the protection of the vast majority of employees now covered by the codes. Until the Supreme Court has ruled, this opinion of the Circuit Court of Appeals will be accepted as the most authoritative statement of the law which is, in brief, that the NIRA and its administration are fundamentally constitutional." . . . The defendants were sustained on the wages and hours counts by a two to one vote. . . . Mr. Richberg said the decision sustains NRA as to regulation of business in interstate commerce; holds it as a proper delegation of power by Congress and sustains regulation of trade practices. . . .

At the time Mr. Richberg was rejoicing over the poultry decision, NRA was being scored at hearings before the Senate Committee on Finance. . . . Among its attackers was Frederick S. Kellogg, representing W. Ames & Co., Jersey City, N. J., iron and steel manufacturers. . . . Mr. Kellogg told the committee that the steel code "permitted monopolistic control of the industry by large and dominant interests, aided and abetted by the Government itself." . . . Suit has been filed by the company with the Supreme Court attacking the constitutionality of NRA. . . . the company alleges a practical boycott has been suffered by it in connection with public work because it did not sign the steel code. . . .

Shifting over to the House side, the Committee on Labor heard Secretary of Labor Frances Perkins urge again that the labor board proposed by the Wagner bill be placed under the jurisdiction of the Department of Labor. . . . Chairman Connery said Miss Perkins had succeeded in selling him the idea which is favored too by the American Federation of Labor, which bitterly opposed the appointment of Miss Perkins, the first woman member of the cabinet. . . . Miss Perkins has an able assistant, spokesman for the A. F. of L., Ed McGrady. . . . Understandable

it is that A. F. of L. favors letting Madam take charge of the Wagner labor board, if and when set up. . . . Organized labor has made peace with her just as it has made peace, temporary or otherwise, with Mr. Richberg, since Phil Murray, vice-president, United Mine Workers, was made a member of NLRB. . . . A fly in the ointment is that Senator Wagner does not propose that the labor board, if and when established, shall come under the supervision of the Department of Labor. . . .

There are growing bets now, however, that the Wagner bill will never be enacted. . . . This is a turnabout in sentiment and no doubt is due partially to the heavy onslaughts made against it by industrialists. . . . Sources which claim to know positively say the Administration has never promised to support the Wagner bill but will insist on legislation giving power of enforcement to Section 7-a by the National Labor Relations Board. . . . They think this board as well as all other existing boards, including the National Steel Labor Relations Board and the Automobile Labor Board, will be continued, despite the fuss and feathers raised by organized labor. . . .

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Contractors Plan Large Convention

Anticipating a summer of the most intensive construction activity in five years, the governing and advisory boards of the Associated General Contractors of America will hold their annual spring meeting in Washington, May 2 and 3, to lay plans for the expeditious handling of their industry's part in the President's \$4,880,000,000 work relief program.

Representative contractors from the building, highway and heavy construction and railroad divisions of the industry will participate in the meeting, which will give detailed attention to the question of facilitating contract methods in each of the various construction fields included in the Emergency Relief Appropriation Act.

Contractors believe that a major portion of the construction phases of the program will be executed under contract in view of the provision in the measure that full advantage shall be taken of the facilities of private enterprise in the carrying out of the work. The board will exert every effort to see that this is done.

E. J. Harding, managing director of the contractors' associa-

tion, in announcing the call for the governing and advisory boards meeting, expressed the belief that under the impetus of the work relief measure the coming summer will witness a banner season in all lines of construction. He pointed out that the fund, as earmarked in the bill, will provide, in itself, a well-rounded volume of building, highway and heavy construction projects. Harding also was optimistic as to the prospects of revival in private residential construction, and declared that the board would give special attention to the small home builder at its May meeting.

The meeting will follow immediately upon the conclusion here of the twenty-third annual meeting of the United States Chamber or Commerce.

Higher Tariff Sought

Observing the New Deal's unctuous crusading against "tariff barriers," there is a general impression that the ultimate of futility is for American manufacturers to ask for more protection. The State Department is tearing down existing duties on iron and steel and a long line of other products in an almost religious frenzy to "open the channels of world trade." So one may indeed take with a grain of salt any attempt NRA may make or pretend to make to afford higher duties made necessary by code provisions fixing minimum wages and maximum hours.

Recently merchant blast furnace interests along the Atlantic seaboard complained to the import section of NRA that increasing imports of pig iron from the Netherlands and British India threaten to render ineffective the code for the iron and steel industry. The import section is "investigating." Now a group of manufacturers has "demanded" of the Roosevelt Administration that section 3 of the NIRA be strengthened so as to compel the President to increase import duties where it is shown that incoming shipments are injuring American industry. At present the section leaves it to the discretion of the President as to whether he shall increase duties. In all NRA has some dozen or more demands for increased duties as a means of protection from low cost imports.

The Cotton Textile Institute is especially active in demanding more protection against Japanese imports of textile products. Donald R. Richberg, chairman of NIRA, says the proposals are being "studied," a synonym for "investi-

gated." Study, investigate, report, analyze, and spend are the orthodox things of an otherwise rather unorthodox Administration. But it doesn't mean any more than the "inventions" pictured in a well-known cartoon.

How could "tariff barriers" be removed and the State Department proceed with its beloved reciprocal agreements if by chance duties should be raised in behalf of American industry and labor and affect a country with which "bargaining" negotiations are under way? How embarrassing it would be! And how destructive to "gestures of good will." And to the free flow of commerce?

If NRA really succeeds in having duties raised on any of the products involved in complaints before it, it will come as a general and refreshing surprise. It would have to be done in the face of an entirely contrasting policy of the State Department.

Industry would do well in asking for greater protection to seek the cooperation of labor. For the latter, if putting up a united front, whether affiliated or not affiliated with any organization, would be more potent than industry itself these days.

Blue Eagle But Not Business Taken Away

Upon recommendation of the National Labor Relations Board the NRA compliance division recently deprived the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., of its Blue Eagle because of the alleged refusal of the company to bargain collectively with organized labor. The case was then referred to the Department of Justice and it promises to be tested in the Supreme Court.

Despite this action, however, the National Industrial Recovery Board has announced that the company will not be barred from selling its products to the War Department and other Government agencies. Ordinarily, concerns are denied the right to Government business after the Blue Eagle has been taken away. The NIRA, however, said that "because of several legal questions involved," it had decided not to advise the War Department to refrain from purchasing goods made by Colt's. The board added that the present action does not mean that the Government will continue to "traffic" with the Colt's company. The action of the board was not further explained but apparently is due to the fact that the Colt's concern is the only source of supply of machine guns

and holds patents not otherwise available to the Government.

How Much Machinery and Steel In \$4,880,000,000 Fund?

Plans for expenditure of the all-time record appropriation of the \$4,880,000,000 have not been announced as this is written. The President, however, it is reported, is about to disclose the organization which will handle the gigantic fund, together with at least the major channels of its distribution. Optimistically estimated by the Administration that it will transfer 3,500,000 unemployed from direct relief rolls to "work relief" projects, and engage a like number additionally in producing resulting requirements, there is naturally deep interest as to what it will mean for the heavy industries. The entire measure has been surrounded with mystery, and plans for use of the money have been utterly vague or entirely secretive. Consequently it has been speculative only as to what it will mean for such lines as machinery and steel.

On signing the measure Monday the President allocated \$125,000,000 to the Federal Relief Administration and \$30,000,000 to the Civilian Conservation Corps. It was expected that detailed plans for expenditure of the remainder of the money or a large portion of it would be announced soon.

The principal guide heretofore used to gauge use of the funds has been the report submitted about three months ago by the National Resources Board. Its ambitious program set forth details for highway construction, rural rehabilitation, slum clearance, grade crossing elimination, etc. The supposition is that these projects will be included in some of the undertakings. Potentially they could mean a great deal of steel as well as a sizable volume of machinery, especially road machinery. But whether the actual outlay will develop into large orders of these kinds remains to be seen. It is not believed that they will entail anything like the volume that ballyhoo already put forth and yet to be poured out would indicate. Moreover, it is not believed that the actual business will reach the plants in important quantities for at least three months.

The bill carries an amendment which continues the PWA for two years and preserves much of its powers. The President had asked that this be done. This provision was taken to indicate continuance of the subsistence homestead project until the original \$50,000,000

for that purpose, had been expended. There is a difference of opinion, however, as to whether additional funds for this purpose might be used by PWA and the question may have to be settled by the Controller General. Building of rural industrial communities, resurrection of the forest belt project and acquisition of submarginal lands were uppermost in the minds of many members of Congress—those from rural communities and western districts—as they discussed the bill.

Aluminum Code Again Extended

WASHINGTON, April 9.—The NIRB has again extended the effective period of the aluminum industry's code, to June 16, 1935. The code was extended as modified by administrative order effective March 25, suspending operation of Article IX, the fair trade practice section.

This is the fourth extension of the code, which was approved June 26, 1934, for a trial period.

Steel Drums: The NIRB has approved an amendment to the code for the standard steel barrel and drum manufacturing industry, setting up a price filing system but without a waiting period.

Metal Window: The code authority for the metal window industry has made application to the NIRB for approval of a \$30,175 budget, and the basis of contribution, for the period from Feb. 1, 1935, to Feb. 1, 1936. The budget includes \$5,475 for the expenses of the Pacific Coast area.

Vitreous Enameled Ware: The NIRB has approved an amendment to the code for the vitreous enameled ware manufacturing industry, eliminating Rule A of Article V, providing for price filing, emergency price control, and banning sales below cost.

Standard Steel Drum: The NIRB has announced approval of an amendment to the code of fair competition for the standard steel barrel and drum manufacturing industry, setting up a price filing system but without a waiting period.

Chain Manufacturing: The NIRB has announced approval of a "liquidated damages" plan of compliance for the chain manufacturing industry, subdivision of the fabricated metal products manufacturing and metal finishing and metal coating industry. The plan is one whereby members of the industry are permitted to enter into an agreement providing for the payment of liquidated damages upon violations of the code by parties to the agreement. The approval order carries forward the original code approval order staying the provision for a waiting period in the code's price filing system.

Copper and Brass Products: The code authority for the copper and brass mill products industry has asked NRA approval of an amendment to the code for that industry, to revise the first sentence of the second paragraph of Article V to read as follows: "No manufacturer shall directly or indirectly sell, offer or contract

to sell his products, or purchase or offer to purchase scrap, at prices other than those stated on the latest price schedules of such manufacturer filed with the executive committee."

Tool and Implement: The code authority for the tool and implement manufacturing industry has asked NRA approval for its estimated budget of \$55,000 for expenses of code administration during the fiscal year ending March 31, 1936, and for the proposed basis of contributions from industry members of 5 mills per dollar of gross sales.

Automotive Shop Equipment: The code authority for the automotive shop equipment manufacturing industry, a product group of the automotive parts and equipment manufacturing industry, has asked NRA approval of a proposed code budget of \$4,000 for the period Dec. 10, 1934, to June 16, 1935, and for a proposed basis of contribution of 1/20 of net 1934 sales.

Cutting Die: The supplementary code authority for the cutting die manufacturing industry has asked NRA approval of its proposed \$3,375 budget of code administration expenses during the period Dec. 19, 1934, to June 16, 1935, and for a basis of contribution from members of the industry equal to \$1.60 for each person employed.

Wire Rope and Strand: The wire rope and strand manufacturing industry has applied for approval of several amendments to its supplementary code. The proposed amendments would establish a divisional code authority of 17 members; prohibit guarantees against price declines; set current scrap prices as the value of all used products turned in for credit; provide for modification of the supplementary code; establish a liquidated damages plan and deny marketing practices application to export sales.

Special Tool, Die and Machine Shop: The code authority for the special tool, die and machine industry has applied for ap-

proval of a new definition of the industry, as follows: "The term 'Industry' as used herein, is defined to include the design, development, manufacture, repair and/or assembly for sale of special tools, special dies, molds, pressure molds, special jigs, special gaging fixtures, machinery of a special custom-built nature not now or hereafter regularly produced in another product classification, and/or the products of general machine shops, and such other shops usually designated as jobbing and repair shops when such products are made or such work performed on a 'jobbing shop' basis."

Metal Window: Amendments to the metal window industry code were discussed at a hearing March 26 by R. H. Sartor, commissioner of the code authority. Included in the amendments proposed at the hearing were those denying application of the code to export sales; clarifying the status of screens in relation to pricing provisions; exempting inter-industry sales from price filing provisions; forbidding multiple bidding and order splitting; clarifying the definition of industry products and dealers; and setting rules for revision of price lists.

Code Authority Members: NRA has announced recognition of the following as duly elected members of code authorities of **Used Machinery & Equipment Distributing Trade**—M. D. Galbreath, Marr-Galbreath Machinery Co., Pittsburgh; L. E. Emerman, Emerman Co., Chicago; A. Goldman, Riverside Machinery Co., Detroit; J. E. Middleton, L. F. Seyfert's Sons, Inc., Philadelphia; C. A. Simmons, Simmons Machine Tool Co., Albany, N. Y.; J. L. Lucas, J. L. Lucas & Son, Bridgeport, Conn.; and J. E. Launder, Independent Electric Machinery Co., Kansas City.

POSSIBILITIES and advantages of metal spinning will be outlined in a series of bulletins to be issued by the Milwaukee Metal Spinning Co., 227 East Lincoln Avenue, Milwaukee. A giant milk bottle spun from a piece of aluminum, miniature beer barrels spun of 16 gage sheet steel, and seamless beer still and alcohol chamber cups are examples of unusual spinings illustrated in the first of the series. Rapid production and savings through the elimination of expensive dies are featured.

John Wiley & Sons, Inc., 440 Fourth Avenue, New York, has just published a book entitled the "Working, Heat Treating, and Welding of Steel." This textbook is designed for novices in industry, and concisely presents current steel-making processes in easily understood language. Certain phases of the metallurgy of steel are described, and numerous charts, diagrams, section drawings, and micrographs are provided to aid the reader in understanding the elements of steel manufacture and steel structure. Welding processes are reviewed as well as various methods commonly used to protect metal from atmospheric corrosion.



C. B. NOLTE, who, as announced in these columns last week, has been elected president of the Crane Co., Chicago. He is a member of a number of technical societies, including the American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Testing Materials and American Railway Engineering Association.

Steel Code Attacked by Attorney for Ames Company — Monopoly Charged

WASHINGTON, April 9.—Attack on iron and steel code and the code of the reinforcing materials fabricating industry was made before the Senate Committee on Finance last week by Frederick S. Kellogg, Montclair, N. J., appearing for W. Ames & Co., Jersey City, N. J. Mr. Kellogg assailed what he said were commercial restrictions on buying and selling in the codes, the price fixing in the steel code and "the price fixing operated peculiarly through a basing point system." He also attacked what he termed "the monopolistic control of the industry by the large and dominant interests which is permitted under the law, and which through certain actions of the Government is aided and abetted by the Government itself."

"I do not say that the Government intended to produce that result," he added, "but I say that what has been done has resulted in that way."

Further criticism was made by way of objecting to "the attempt of the Federal Government to regulate matters of production, that is, manufacture as distinguished from commerce, and included under this head is the relation of employer and employee in the productive process." He declared he did not think there is the ability in the Government or anywhere else to regulate the productive local processes of the entire country from one central place.

Provisions Singled Out

Mr. Kellogg criticized "peculiar provisions in the code about hot iron ingots," stating that there is no such thing. Replying to a question by Senator Barkley of Kentucky, Mr. Kellogg said that the only effect it has is that the code authority "later in the process" said it had added numerous basing points to the code and among other things "they added a basing point at Jersey City, where our plant is located for iron ingots which do not exist." Mr. Kellogg said that the provision gave a false impression on what the code authority is doing for the company. He said the company does not want a basing point and does not "want the other fellow to sell on any artificial basing point, either."

At some length, Mr. Kellogg criticized what he termed artificial basing points, contending that they

involved "phantom freight." "Now, as a practical matter, the Ames company has been economically unable to buy one single billet since the code went into effect in the latter part of August, 1933," said Mr. Kellogg. "Therefore, it has been shut off, entirely shut off, except for a little stock of billets that it had on hand at the time, from making and delivering any product wherein the specifications required that the product be made from new steel billets. Now that was the net result as far as Ames is concerned. In that particular it has been shut off."

It was declared by Mr. Kellogg that the Ames company also has not been able to buy any plate crops since the steel code went into effect. The reason, he said, for that situation is a regulation imposed by a committee of the code authority. Stating, in response to an inquiry by Senator King, that he believed it was called the technical committee, Mr. Kellogg said the regulations provided that no member of the industry should sell this material for rerolling purposes at the same price he would sell it as scrap to go back into the smelting furnace.

Other Producers Also Suffered

"In other words, the very same material, if Ames wanted to buy, had a higher price than it did if any of those people wanted to buy it for the purpose of smelting," said Mr. Kellogg. "And in that way they raised the price of another raw material."

Mr. Kellogg told Senator King that "a lot of washer people suffered the same thing and, I think, the nut makers, who were stamping these plates by cold stamping, making nuts out of them."

"Have you analyzed the results of the basing point fallacy which was adopted, the results upon the industry, upon the fabricators, using that in the generic sense, upon Ames company and others similarly situated?" inquired Senator King.

"Perhaps I can state it this way: the effect has been to give advantage to the integrated units in the industry," replied Mr. Kellogg.

"And tended to raise the price of steel to—" Senator King started to ask.

"It raised the price of steel \$10 a ton on that raw material of Ames

overnight," Mr. Kellogg interposed.

After Mr. Kellogg enlarged on this point, Senator Harrison inquired whether the basing point as it applies to one part of the steel industry may be one place and as to another it may be a totally different place.

"That is perfectly true," responded Mr. Kellogg. "There is a whole schedule for basing points for various things in the code and they change it slightly from time to time."

Answering a question by Senator Harrison, Mr. Kellogg said that the Ames company did not join the code and "as it went on, we concluded it would mean our economic death to do it. We observed our raw material being put up and our finished product not being put up, and we were being squeezed right in between, and if we joined the code we had to sell at those prices and had to buy at those prices. And the thing was just a squeeze of the processor." Mr. Kellogg said that the company tried to get before the code authority by correspondence but that "the thing finally bogged down on Nov. 13, 1933, and there is still an unanswered letter addressed to the code authority, which we sent to NRA, and asked them what to do about it, and did not get an answer as far as the code authority goes, until the last two weeks."

Mr. Kellogg said that his company observes the hours of labor and wages in the steel code.

He detailed the experience of the company in attempting without success to get highway work in New Jersey to be financed through loans under the national highway act. Mr. Kellogg said the company was barred from bidding because it did not have a Blue Eagle. While the company was "battling" the situation through different Washington officials, Mr. Kellogg said the President issued an executive order which excluded "down to the last limit from any participation in any work where Government money is put in any particular place any particular part anybody who has not got a Blue Eagle." Further efforts were made, it was stated, among them unavailing appeals to former Administrator Hugh S. Johnson and Donald Richberg, administration coordinator, to get an exception to the order and to get some of the steel business. The case was taken by the company to the Court of Appeals of the District of Columbia. The company recently filed with the Supreme Court of the United States a petition for hearing, for certiorari before determination by the District of Columbia Court of Appeals.

OBITUARY

John Hill Whiting, chairman of the board, Whiting Corp., Harvey, Ill., died April 6. For over 50 years he was closely associated with the casting industry and, as a pioneer manufacturer of cost-reducing equipment for foundries, contributed materially to the growth of the foundry industry in America. Mr. Whiting began as a clerk in the foundry of the Michigan Car Co., Detroit, and rose rapidly to successive positions of responsibility until he became general superintendent of the plant. In the meantime he had developed numerous short cuts and improvements in the manufacture of car wheels and acquired several patents on the Whiting straight line system, which was based on the same principles used in automotive shops today. Mr. Whiting also acquired patents on improvements in cupola furnaces and other equipment for foundries. This led to the idea of making such equipment on a commercial scale. A company was formed and soon foundrymen were educated to the use of the improved commercial products rather than home-made equipment as had been the practice up until this time. The new enterprise succeeded, and the line gradually increased to include ladles, tumbling mills, elevators, traveling cranes, etc. In 1894 the business was moved to Harvey, Ill., under the name of Whiting Foundry Equipment Co., which has since become Whiting Corp. Mr. Whiting was born at Sault Ste. Marie, Mich., on Oct. 11, 1850.



J. H. WHITING

vers had been associated with the Dow Chemical Co. since its organization in 1897 and for many years up to 1918 had been president of the company. He had lived in Cleveland until five years ago.

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DR. F. THOMAS NASON, chairman of the executive committee of the McKeesport Tin Plate Co., McKeesport, Pa., died in the McKeesport Hospital on April 4, aged 68 years. He was also president of the Columbia Radiator Co. and a director of the Metal Package Co.



A. ADAMS, plant superintendent of the Mathews Conveyor Co., who died on March 23. A sketch of his career was given in these columns last week.

EDWARD E. GREEN, contracting engineer at St. Louis for 28 years for the American Bridge Co., with which company and its predecessor he would have rounded out 40 years of service next month, died at his home in St. Louis on March 30 after an illness of several months. He was 63 years of age. Mr. Green was born in Chicago, and his first work was with the Chicago office of the Milwaukee Bridge & Iron Co. He continued with the American Bridge Co. when it was formed in 1900 with the former company as one of its parts.

ALBERT E. CONVERS, chairman, Dow Chemical Co., Midland, Mich., died in a Cleveland hospital April 3, age 73 years. He was stricken five days before his death while in Cleveland on business. Mr. Con-

FRANK L. MORSE, president, Morse Chain Co., Ithaca, N. Y., died at Orlando, Fla., on March 25, aged 70 years. With his brother he founded the Morse Chain Co. and until four years ago was active in its development and progress. Mr. Morse was a director of the Borg-Warner Corp. and of a number of financial institutions.

Pipe Lines

Fort Smith, Ark., plans call for bids in May for about 23 miles of 27-in. steel pipe, with alternate bids on cast iron and concrete pipe, for main water trunk line; also for construction of dam on Clear Creek, 6,000,000-gal. filtration plant and other waterworks equipment. Fund of \$1,500,000 has been arranged through Federal aid. W. R. Holway, 302 East Eighteenth Street, Tulsa Okla., is consulting engineer.

Magnolia Petroleum Co., Magnolia Building, Dallas, Tex., has let general contract to Mitchell-Stewart Construction Co., Dallas, for extensions, replacements and reconditioning of steel pipe lines for oil service in Texas area, about 700 miles. Cost close to \$1,000,000.

Montana-Dakota Power Co., 831 Second Avenue South, Minneapolis, Minn., has authorized new 4-in. steel pipe line for gas service in Tourist Park district, Rapid City, S. D., about 9000 ft.

Superintendent of Construction, Indian Service, Billings, Mont., asks bids until April 15 for black steel pipe for Standing Rock Agency; also for pipe fittings, valves, etc.

Michigan Cities Natural Gas Co., Union Guarantee Building, Detroit, plans new 4 and 6-in. steel pipe lines from natural gas wells in Bloomfield and Sherman Townships, Isabella County, to connection with system of Consumers Power Co., Midland, Mich., for distribution by last noted utility.

Eureka, Cal., plans steel pipe line from new source of water supply to be developed on Mad River near Korb, Cal., to city limits. Project will include concrete dam, reservoir and other waterworks construction. Fund of \$1,224,000 has been arranged. C. C. Kennedy, Call Building, San Francisco, is consulting Engineer.

Railroad Equipment

Fisher Body Corp. is having 100 box cars built in shops of Merchants Despatch.

Erie has ordered 55 milk car bodies from Greenville Steel Car Co.

Delaware River Bridge Joint Commission has ordered 26 coaches from J. G. Brill Co. U.S.S. Cor-ten high-tensile steel has been specified for the cars.

Brooklyn-Manhattan Transit Corp., New York, has asked the Transit Commission for approval of orders for 25 five-car articulated subway units. The tentative allocation is 15 units to the Pullman-Standard Car Mfg. Corp. and 10 to the St. Louis Car Co.

Brooklyn-Manhattan Transit Corp., New York, acting for its subsidiary, the Brooklyn & Queens Transit Corp., has sent out invitations for separate bids on 100, 300 and 500 Hirshfeld-type street cars to be built of Cor-ten high-tensile steel. Any cars beyond 100 will be purchased by other traction lines in collaboration with the Brooklyn company.

Chicago, Burlington & Quincy will build 500 composite gondola cars in its Galesburg, Ill., shops. All of these will have Cor-ten high-tensile steel floors and 50 will have one end built of that material. This road also contemplates building 250 hopper cars.

San Francisco will take bids April 12 on 235 tons of rails for the municipal railway.

What "Yankee Shrewdness" Means To Worker, Farmer, Manufacturer

THE Belgian-American trade agreement, as the first reciprocal trade convention to go into effect, is of interest as an example of what we may expect to gain from the "Yankee shrewdness" promised us by the present Administration. Almost simultaneously with the proclamation of the trade agreement, the Belgian Government depreciated its currency 28 per cent, thereby gaining, in effect, a second reduction in duties beyond those granted by this country. But, this is not all. After conceding the Belgo-Luxembourg economic union lower duties, we magnanimously extended those reductions to all other nations.

Progressive Concessions

Summed up, our "shrewdness" consists of granting concessions to the whole world in order to obtain a few concessions from one country. And the process promises to go on, as other trade agreements are pending. Thus, each time a country grants us certain lower duties, the reductions we allow in return will automatically be extended to all other nations. The obvious ultimate outcome is a steady leveling of our whole tariff structure, as one after another of our import duties is lowered to obtain a new concession from another foreign country.

To those who visualize world economy in terms of trade, nothing but good can come from this process, because, it is argued, removal of trade barriers will open the way for an increasing exchange of goods and services.

This would be a proper conclusion if living standards and wage costs were reasonably uniform throughout the world. But how a high cost country, in which wage rates have been raised under Government sponsorship, can open its gates to the products of low cost nations without harmful repercussions is difficult for the economically unenlightened to understand.

In the steel industry, under NRA, minimum wage rates are fixed for all sections of the coun-

try. Yet, we are in effect adding to that industry foreign producing districts in which the wages are beyond our control. The rate for common labor in leading American steel districts is 47c. an hour. In Belgium the steel worker, according to the latest figures available, gets 17c. an hour. In other European countries his wage ranges from 20c. to 29c. an hour.

Another "Noble" Experiment

But we overlook such a minor point as wage rates in our zeal to try out another "noble" experiment. We have tried the nationalistic policy of lifting wages far above world levels. Now we are turning to an internationalistic policy of tariff elimination which can have no other result than a reduction of prices. How will the American producer succeed in maintaining existing wage rates in the face of lower prices? And how will lower prices fit in with the Administration's avowed purpose of raising the price level to lift the burden of debt left us by the prosperous 20's?

These questions may seem baffling to the ordinary business man, but they are apparently unimportant to the academic enthusiasts at Washington.

Saving the World from Economic Barriers

Much is being overlooked to put over the one big idea, e.g., to save the world from economic barriers. It does not matter that we have unsuccessfully saved the world for democracy and other laudable purposes. "Try, try again" is the motto of a young and incurably optimistic nation.

Our blind magnanimity is typified by our treatment of the constituent countries of the British Commonwealth of Nations. We list them individually as co-recipients of the new lowered duties granted to Belgium. Yet we consider them as a single empire when it comes to preferential duties granted by them to each other. In other words, empire preferentials

are not considered as discriminatory against the United States.

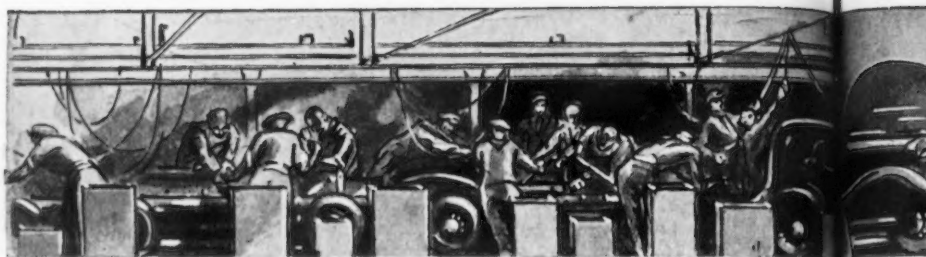
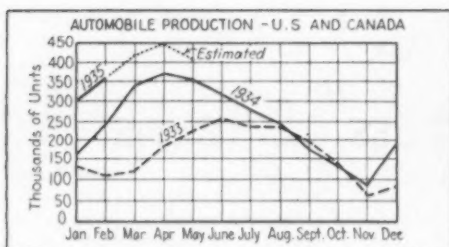
A trade agreement between this country and a member of the British Commonwealth of Nations (or is it really a part of the British Empire?) is now in course of preparation. This particular nation, our neighbor to the North, sharply raised its barriers against us in 1932, at the same time granting larger preferentials to Great Britain. That was its sovereign privilege and perhaps in its own interests, but would it be lese-majesty to suggest that we should keep a keen eye to our own interests in negotiating for a revision of the duties against us?

A "Manitowoc Barley Party"

It is commonly believed that only American industry suffers from lower tariffs, and who worries about the fate of our manufacturing enterprises? The planter and the farmer have long protested against the prices they have had to pay on protected products. But it all depends on whose ox is gored.

Mid-western farmers, incensed because of rising imports of Canadian barley through Lake ports, threaten to stage a "Manitowoc Barley Party" after the manner of the famed Boston Tea Party if the Government carries through its pending proposal to reduce the duty on Canadian malt from 40c. to 20c. per 100 lb. State Senator Cashman of Wisconsin states that between July and December, 1934, approximately 1,800,000 bu. of Canadian barley were unloaded at the port of Manitowoc, and that cutting the duty in half would encourage the importation of that much more.

So the farmer is hurt, labor is hurt and industry is hurt by "leveling artificial trade barriers." Who, then, is helped? Perhaps practical Mother Britain can supply the answer. Anticipating the depreciation of the Belga, the British on March 26, sharply advanced its duties on various iron and steel products commonly exported by Belgium and Luxembourg.



THIS WEEK ON THE Car Makers, Assured Big Second Quarter, Expect Good Third Quarter

DETROIT, April 9.

THE "Michigan Miracle," as one writer for popular magazines has labeled recovery in the automobile industry, continues to astound the country. Production of cars this year has exceeded the most sanguine hopes of sales executives. Current operations are more than 100,000 units a week, with no decline anticipated for at least a few weeks. When manufacturing activities begin to taper, the decrease will be gradual, with output being maintained at a high level during the entire second quarter.

Whereas a few weeks ago car manufacturers were voicing high-sounding predictions about the second quarter largely because the wish was father to the thought, today they are convinced from the marked upward trend in retail sales that nothing can stop the industry from running up an enviable record for the first half of the year. Although Ford's retail sales in the first quarter were 33 per cent greater than the combined totals for the same quarter in 1932, 1933 and 1934, and although Ford built 410,933 cars and trucks during the first three months of this year, Ford dealers in all parts of the country still have sizable waiting lists of customers seeking deliveries.

Pontiac's retail sales in the initial quarter amounted to 38,573 cars, a gain of 154 per cent over the 15,164 cars sold in the same quarter a year ago. Its production was 51,809 cars. Yet today the factory has on hand as many unfilled orders as at any previous time this year. Dodge dealers last week made retail deliveries of

9,132 cars and trucks, the largest volume for any week since May, 1926. Olds set a new mark the past week when 4577 cars came off the lines at Lansing. Chrysler shipped 249,064 cars from its various factories in the first quarter for an all-time record. In fact, the shattering of sales and production records has become almost commonplace in the automotive industry.

July Was Peak Sales Month

Satisfied that they have the second quarter salted away pretty much in the manner they earlier had hoped for, car manufacturers are surveying the possibilities of the third quarter. They are not so sure as they were a month ago that they see a sales valley ahead, at least not a yawning chasm. Few people remember that the peak sales month for passenger cars in 1933 and 1934 was July and in 1932 was June. Last year 30 per cent of the year's business was done in the third quarter. Perhaps that is too much to expect this year, in view of the excellent sales volume during the first quarter, but there are good reasons for believing that retail car demand should be fairly brisk in July, August and September.

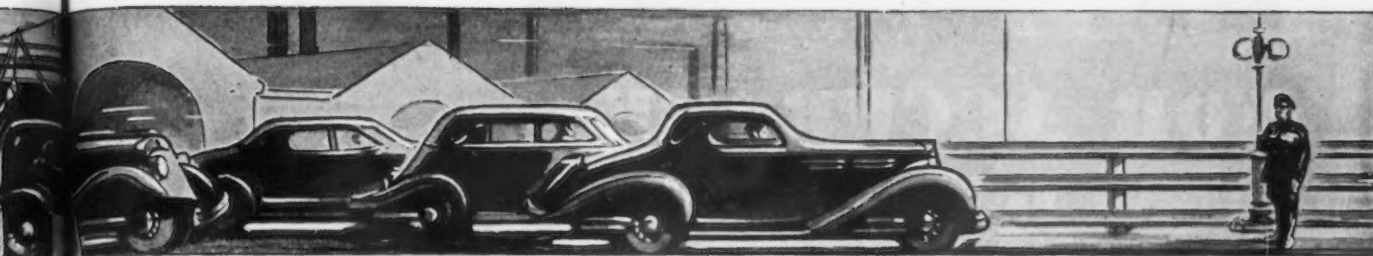
Not the least among the reasons will be payment of AAA crop money to farmers by the Federal Government as well as the cash received by them from the marketing of their products at higher prices than a year ago. This factor figured substantially in stimulating car sales the latter part of 1934 and again looms as a consideration to be reckoned with. Then the launching of the adminis-

tration's \$4,800,000,000 work relief measure should have a far-reaching effect on the automobile industry, which benefited tremendously in an indirect way from previous Government spending programs, such as the CWA and PWA. The full force of these developments will not be felt until the second half of the year, when their influence will be most needed.

Last year the farmer began to buy cars for the first time since the depression set in. The factory worker, however, was yet too poor to make such investments. It is only recently that the first signs have appeared to indicate that he is starting to get back on his feet financially. Once again he is purchasing new cars, although admittedly on a meager scale. This fact shouldn't be blown up into undue proportions, because at best the factory worker this year will be only of minor importance in the final check-up of new cars sold. Usually men in the shop purchase used cars, but the older cars today are so much more expensive to operate than the new ones that the latter seem to be gaining in percentage over the former.

Used Car Situation Serious

Used cars are giving the industry more concern than probably any other subject. Abnormally heavy sales of new cars in the first quarter resulted in the accumulation of large stocks of "trade-ins" by dealers at a time of year when used car demand is relatively light. Every dollar tied up in stocks on used car lots is one less dollar which the dealer can spend for new cars. Hence the industry's anxiety about the situation and



ASSEMBLY LINE

the staging by dealers, with factory help, of used car sales campaigns.

With the 1936 season due to open Aug. 1 under the fall announcement plan of the Automobile Manufacturers' Association, programs of some companies have gone beyond the formative stage. Buick, which is in the midst of its tool and die work for coming models, will resume its old place at the head of the General Motors procession of new cars. It is likely to introduce its 1936 series around Aug. 1. It is said that the new Buicks with turret top and knee action wheels, will be of relatively conservative design so that the public still will be able to recognize the car as a Buick. Cadillac, engaged in redesigning its V-eight engine so that the cylinder block and crankcase will be cast in one piece, as is Ford's block, should have its new line out in August. The LaSalle, introduced a few weeks ago, is believed to be a "fill in" which will be succeeded late this year with a 1936 model.

Perhaps Ford's smashing success this year with its V-eight is sufficient excuse for talk to crop out again about the possibility that Chevrolet may go to a straight eight motor. The flame of stories has been fanned by the reported rehabilitation in Saginaw, Mich., of the factory used by Chevrolet at the time it developed a six-cylinder engine to replace the four. Possibly this plant may again be utilized by Chevrolet, this time to experiment with an eight. That Chevrolet will start its 1936 season with an eight, however, appears out of the question.

As matters now stand, Chevrolet is not likely to make any radical mechanical changes next year, at least in its Master car. Chevrolet officials are sensitive after two successive years of production delays and are reported to be preparing to have all engineering changes ready by July 1.

By **BURNHAM FINNEY**
Detroit Editor, **THE IRON AGE**

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Pontiac's sensational sales climb this year with its sixes and eight makes probable for 1936 an expansion in productive capacity. In its factory at Pontiac it has manufacturing space to build 400,000 cars a year, but has only one out of three lines tooled up for its current series of cars. In fact, it is held back by the limited facilities of the Fisher Body plant, which supplies it with bodies. If pushed, Pontiac's factory could make around 1100 cars a day, but it has experienced difficulty in securing more than 800 bodies a day from Fisher.

However, Pontiac will come close to its goal of 150,000 cars in 1935 and next year should increase its volume if recovery continues in motor car sales. Of course, it will have to expand its dealer organization if it expects to sell more cars, but that should be no trick with President H. J. Klingler in charge. Formerly Mr. Knudsen's right bower in Chevrolet, Mr. Klingler already has done a remarkable job in Pontiac of building up a dealer organization which was in bad

shape when he took hold. Expansion of Pontiac's productive capacity would mean substantial expenditures for machine tools. It likewise would call for similar enlargement of operations by Fisher Body.

Ford to Spend \$1,000,000 for New Equipment

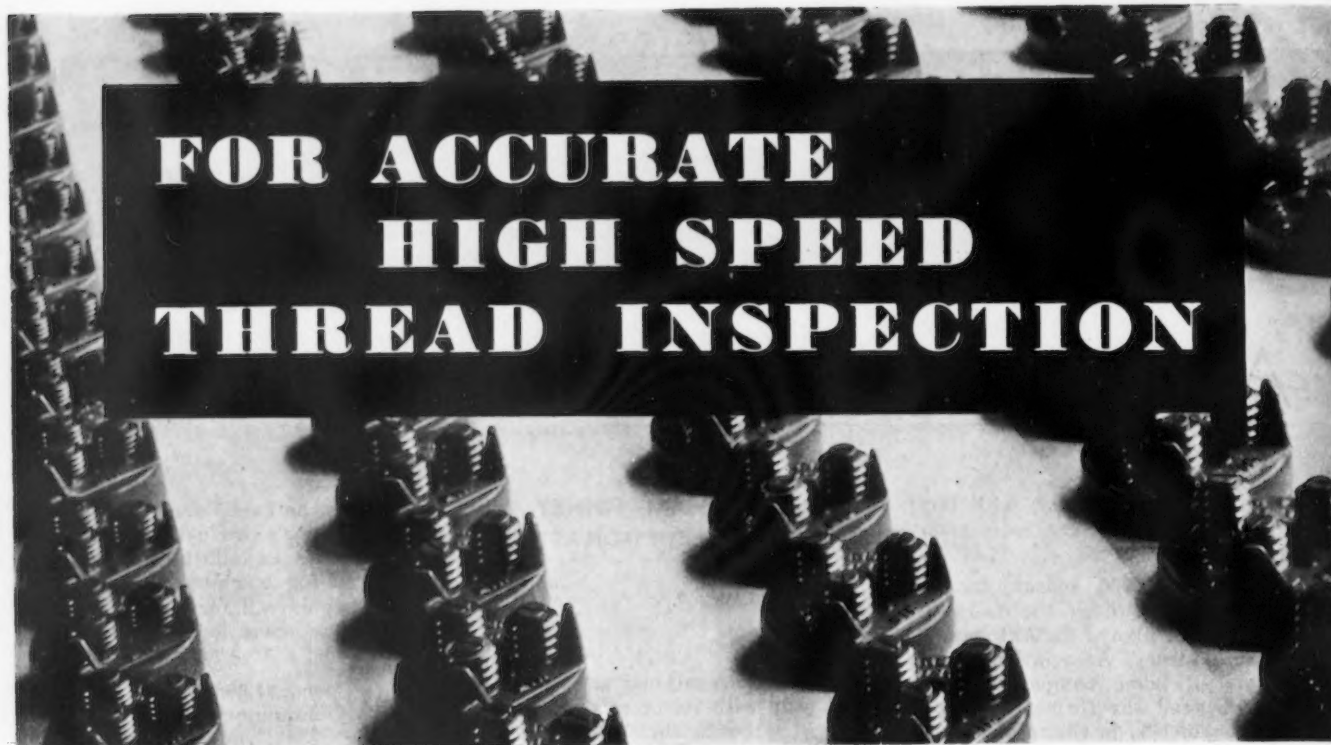
Ford has designed a smaller replica of its present V-eight motor which, according to reliable reports, will be used in Ford cars made in England and France. The motor has no relationship to that developed about two years ago for the so-called 44 job, which was shelved permanently. Production lines for the building of the new motor will be established at Dagenham by Ford of England and presumably at the Mathis factory in France. Equipment to machine the motor, which is understood to have a bore of less than 3 in., will be bought in this country at the Rouge plant by a representative of Ford of England, who is now at Dearborn. Expenditures probably will be at least \$1,000,000. A large amount of boring, tapping and drilling tools will be included among the purchases. It is believed that initial orders will not be placed for two weeks or longer and it may be near the end of the current quarter before the buying program is completed.

It is apparent that if Chrysler operations continue to grow, as they have in the last few years, something will have to be done to increase its manufacturing space or to utilize still more efficiently present plant capacity. Plymouth is at its peak at about 2300 motors a day with the equipment now in its local plant, but it is estimated that this capacity could be augmented about 25 per cent by installation of high-speed machinery to plug up weak spots in the line. Plymouth, of course, has no assembly plants outside of Detroit, with the exception of one on the Pacific Coast, and is faced with the

(CONTINUED ON PAGE 45)

FIRST QUARTER HIGHLIGHTS

Production (U. S. and Canada):	
Entire Industry	1,109,591
Ford	410,933
General Motors:	
Pontiac	51,809
Oldsmobile	44,000
Chrysler	249,064
Plymouth	136,040
Hudson	34,881
Graham-Paige	9,089
Retail Sales (U. S. Only):	
Entire Industry	651,806
Ford	293,318
General Motors:	
Pontiac	38,573
Plymouth	136,040



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price competition of Ford and Chevrolet, which realize a goodly share of their profits from "equalized freight," or the difference between the delivered price of a car f.o.b. Detroit or Flint and the actual transportation cost from the nearest of their numerous assembly plants.

What with "bloodless purges" to rid the organization of disloyal employees, action by the New York Stock Exchange to disbar listing of its stock, a strike in its plant called by the American Federation of Labor, application to the Federal reserve for a loan of \$2,000,000 for badly needed working capital, and action by stockholders to oust the present management, Archie M. Andrews and his lieutenants at Hupmobile have had what might mildly be described as a wearing week. The crux of the matter seems to lie in whether suppliers will cooperate in furnishing material on other than a C.O.D. basis.

Steel Releases Maintained

Steel releases from car manufacturers are coming through at a comfortable rate, although the steel trade seems unable to shake off the false idea that January and February tonnages were normal rather than abnormally large and that anything less than the bookings in the first two months of the year suffers by comparison with that period. Fisher body has given steel mills sizable commitments for Cleveland, Pontiac and Flint, and Ford should buy for May during the next week.

Ford's steel stocks are badly unbalanced at the moment with 30 days' supply of some items on hand and only a week's requirements of other items. May purchases will be made with the purpose of bringing stocks into better balance and of tapering off steel inventories to an average of about a week's needs as the end of the first half of the year approaches. Pontiac is reported to have purchased a moderate amount of steel the past week.

March Output Above Estimates

March surprised the industry, as did January and February, with a production larger than estimated. Assemblies in the past month are estimated at 447,561 units which with the exception of April, 1930, is the best monthly output since August, 1929. Aside from 1926 and 1929 the first quarter of this year, with a total production of 1,109,591 units, was the best in the industry's history. It fell only a little short of the 1,162,808 units built in the first quarter of 1926.

April is now estimated at 460,-

000 cars and trucks, a higher total than earlier anticipated. There are no signs ahead of a slowing down in Ford's operations. General Motors expects its current volume at about 166,000 units a month to continue through April and May and possibly through June.

Chevrolet, Pontiac and Oldsmobile are thundering along at top speed with next month likely to be as high as or possibly higher than April in volume of assemblies.

Buick's retail sales in March totaled 6547 units or more than 1000 cars above the anticipated number. Plymouth shipped 44,417 cars to dealers during March and its weekly retail deliveries have soared to a new high mark slightly under 10,000 units. Its production is averaging about 2000 cars a day. Dodge is continuing to assemble 1300 cars and trucks daily. Reo is busy on an order for trucks for Federal Government departments involving \$1,500,000.

Chrysler is announcing a convertible body on the coupe model of its Airstream six which is designed to eliminate squeaks and rattles. An independent X-type body frame is built into the body itself giving the car a 10-in. frame in its central section. Heavy cross members support the body and a ribbed steel floor board extends its full length.

Fiat Buying American Machinery

Fiat, Italian automobile manufacturer, has started the purchase of equipment in this country for machining of the Hornet airplane engine which it is licensed to build in Italy through an arrangement with the Pratt & Whitney Aircraft Corp. It also may buy machine tools for its automobile production lines. Orders are being placed through the company's office at 3306 David Stott Building, Detroit, which is in charge of M. E. Merri-man, Fiat's technical and commercial representative in the United States.

Five-Room Steel House for \$2,000

(CONCLUDED FROM PAGE 29)

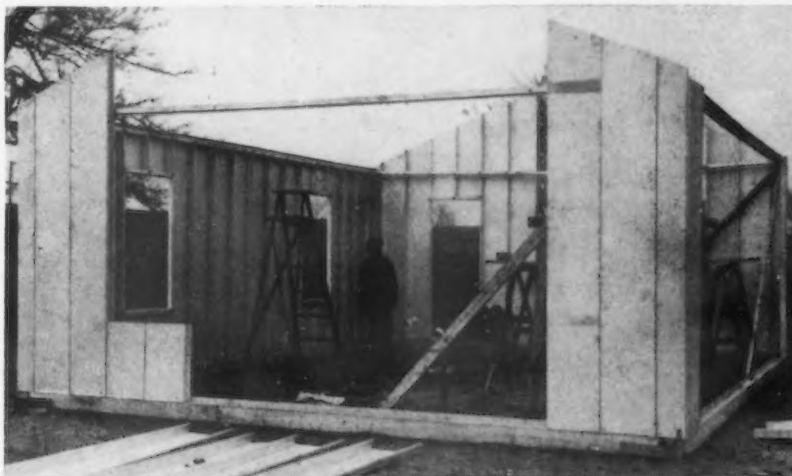
thermal conductivity through the interlocked members.

Since all steel parts are factory cut, cost of erection is low. Parts can be assembled in only one way, no special training being necessary to fit the units together. An occasional coat of paint is all the maintenance work required for many years. The insulation and air spaces reduce heating expense to a low figure. Colors and decorative effects for commercial buildings are almost unlimited and can be built into the structure at the factory instead of being added at extra expense after the building is com-

pleted. Special effects include the embossing or corrugating of the steel panels, ribbing or fluting them, enameling them in a flat or high luster, finishing them in a solid color or shaded. Panel units can be secured with a porcelain enamel finish.

The structural joint provides for expansion and contraction with changes in temperature.

The Steelex type of construction was first described in THE IRON AGE of Aug. 9, 1934, in connection with the building erected at the Century of Progress by the American Milk Goat Record Association.



COST of erection is low because all parts are factory cut. There is only one way in which the parts can be assembled, so no special training is necessary to fit the units together.

Current Metal Working Activity Statistically Shown

These Data Are Assembled By THE IRON AGE From Recognized Sources And Are Changed Regularly As More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	March, 1935	February, 1935	March, 1934	Three Months, 1935	Three Months, 1934
Raw Materials:					
Lake ore consumption (gross tons) ^a		2,467,269	2,189,566		5,573,615
Coke production (net tons) ^b		2,873,432	3,129,973		8,336,252
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	1,777,028	1,608,552	1,619,534	4,862,916	4,098,433
Pig iron output—daily (gross tons) ^c	57,098	57,448	52,243	54,032	45,381
Castings:					
Malleable castings—production (net tons) ^d		41,377	43,438		107,794
Malleable castings—orders (net tons) ^d		41,225	42,961		112,056
Steel castings—production (net tons) ^d		29,687	39,491		95,661
Steel castings—orders (net tons) ^d		31,725	60,046		122,040
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e ..	2,830,700	2,742,125	2,761,438	8,406,995	6,915,785
Steel ingot production—daily (gross tons) ^e	108,873	114,255	102,275	109,182	88,664
Steel ingot production—per cent of capacity ^e ...	49.18	51.61	46.45	49.32	40.27
Employment in Steel Industry:					
Total employees ^f		420,397	419,277		405,196
Total payrolls (thousands of dollars) ^g		44,213	41,263		112,566
Average hours worked per week ^h		35.6	33.9		32.4
Finished Steel:					
Trackwork shipments (net tons) ⁱ		2,892	4,446		10,597
Sheet steel sales—(net tons) ^j		184,355	158,244		552,062
Sheet steel production (net tons) ^j		219,062	220,282		578,734
Fabricated shape orders (net tons) ^k		70,980	105,537		272,425
Fabricated shape shipments (net tons) ^k		65,430	65,728		170,860
Fabricated plate orders (net tons) ^d		15,064	38,924		69,462
Reinforcing bar awards (net tons) ^e	17,335	22,265	19,300	55,200	51,300
U. S. Steel Corp'n. shipments (tons) ^h		583,137	588,209		1,305,486
Ohio River Steel Shipments ^{hh}		64,369	47,897		106,379
Fabricated Products:					
Automobile production U. S. and Canada ^{dd}	*447,561	358,658	345,443	*1,109,591	749,532
Construction contracts (37 Eastern States) ^l		\$75,083,500	\$178,345,800		\$461,525,800
Steel barrel shipments (number) ^d		402,928	703,101		1,982,362
Steel furniture shipments ^d		\$1,064,219	\$955,633		\$2,846,547
Steel boiler orders (sq. ft.) ^d		281,646	375,774		838,643
Locomotive orders (number) ^k	8	1	3	9	23
Freight car orders (number) ^k	0	806	522	830	20,899
Machine tool index ^l		53.0	48.1		150.9
Foundry equipment index ^{ll}		75.7	75.4		159.5
Foreign Trade:					
Imports of pig iron (gross tons) ^m		10,741	20,674		43,337
Imports of rolled steel (gross tons) ^m		11,024	6,822		20,461
Exports of all rolled steel and iron (gross tons) ^m ..		63,739	87,916		253,309
Exports, finished steel (gross tons) ^m		59,147	79,854		227,394
Exports of scrap (gross tons) ^m		156,332	173,165		336,321
British Production:					
British pig iron production (gross tons) ⁿ		483,100	503,600		1,359,300
British steel ingot production (gross tons) ⁿ		769,500	834,500		2,253,000
Non-Ferrous:					
Lead production (net tons) ^o		27,398	35,502		108,421
Lead shipments (net tons) ^o		32,518	30,321		90,010
Zinc production (net tons) ^p	36,216	33,072	33,845	104,902	97,218
Zinc shipments (net tons) ^p	41,137	34,903	32,877	111,578	92,018
Deliveries of tin (gross tons) ^p	5,495	3,905	3,835	14,000	10,085

*Preliminary. †Three Months' Average.
Sources of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^{dd} When preliminary, from Automobile Manufacturers' Association—Final figures from Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp'n.; ^{hh} U. S. Engineer, Pittsburgh; ⁱ F. W. Dodge Corp'n.; ^k Railway Age; ^l National Machine Tool Builders Association; ^{ll} Foundry Equipment Manufacturers Association; ^m Department of Commerce; ⁿ British Iron and Steel Federation; ^o American Bureau of Metal Statistics; ^p American Zinc Institute, Inc.; ^r New York Commodities Exchange.

Demand Tapers and Steel Output Dips to 46 Per Cent

Freight Rate Advance Fails to Alter Cautious Attitude of
Buyers—Miscellaneous Demands Large—Scrap Prices Break

THE emergency advance in freight rates, scheduled to go into effect April 18, has mildly stimulated pig iron shipments, but otherwise has had little effect on the iron and steel market. The rate increases on pig iron and finished steel are too small to warrant much anticipatory buying, and the code protects buyers during the current quarter against price advances that might be warranted by higher freight costs on ore, coal, coke and limestone.

Possible price increases in the third quarter are too far away to cause consumers present concern. Besides pig iron buyers feel reasonably secure against advances because of the low level of scrap prices, while the consuming trade in general continues to hold the belief that any changes that may be made in the NRA or the steel code will benefit the buyer rather than the seller.

EXTREME caution is the rule, and all purchases except for immediate needs are being postponed. Steel mill operations have reacted unfavorably, with the ingot rate down one point to 46 per cent of capacity, but aggregate business volume is holding up much better than had been expected.

While the automobile industry is no longer buying at the rate it did in January and February, when it was accumulating stocks, it continues to be a leading source of demand. Fisher Body Corp'n. has placed sizable orders for Cleveland, Pontiac and Flint, and Ford is expected to buy its May requirements next week. Steel orders from miscellaneous sources are at present bulking larger than automotive tonnage, and the unusual steadiness of unclassified steel business since the beginning of the year is sustaining producers' hopes that mill operations will be spared drastic reductions late in this quarter.

The motor car industry also is beginning to speculate on the possibility of escaping a sharp mid-year recession. Retail sales have far exceeded expectations, those of Ford in the first quarter being 33 per cent greater than the combined totals for the same period in 1932, 1933 and 1934, and a high operation throughout the second quarter is regarded as "in the bag." While no one will hazard predictions beyond that period, attention is called to the fact that the peak sales month for passenger cars in 1933 and 1934 was July and in 1932 was June.

IN PLATE specifications have slackened, but mill output, at 80 to 85 per cent, has dropped only about five points and a continued decline is improbable, since

the peak of demand will not be reached for another month or two. Sheet production is holding at 65 per cent, and output of strip steel and wire products at 50 per cent.

Construction continues to lag behind a year ago, structural steel awards to date totaling 190,113 tons, compared with 221,175 tons in the corresponding period in 1934. The passage of the Federal works relief bill, however, will mean the release of many projects which have been held up for lack of funds. Some of this work may get under way by summer and bolster mill operations when demand from other sources ordinarily slumps. Among construction projects which may go ahead is the proposed \$60,000,000 natural gas pipe line from Texas to Detroit.

Structural awards for the week total 10,600 tons, compared with 8300 tons last week. New projects of 40,868 tons include 25,000 tons for two spans of the Triborough bridge, New York, and 8000 tons for a post office at St. Louis. Plate lettings call for 2850 tons. Among pending sheet steel piling jobs is 7000 tons for the Boston army base. More than 16,000 tons of steel will be bought for the Fort Peck, Mont., spillway, for which the general contract has just been placed.

The new Naval bill is expected to provide for the construction of one aircraft carrier, five cruisers, 12 destroyers and six submarines.

New Orleans has bought 4100 tons of cast iron pipe and Nashville, Tenn., is about to place 2000 tons.

CONSUMER pressure for lower prices on hot-rolled bars following the \$3 a ton reduction on cold-finished bars has as yet been without result. Prices filed on sheet and strip "seconds" have not been accepted to date because producers have not satisfactorily described the secondary products.

Scrap prices, as measured by THE IRON AGE composite for heavy melting steel, have receded from \$10.75 to \$10.42 a ton, following reductions at Pittsburgh, Chicago and Philadelphia. The pig iron and finished steel composites are unchanged at \$17.90 and 2.124c. a lb. respectively.

Steel works operations are off one-half point to 50 per cent at Chicago, one point to 32 per cent in the Philadelphia district, two points to 54 per cent at Cleveland, eight points to 77 per cent in the Wheeling area, and seven points to 88 per cent at Detroit. They have advanced two points to 52 per cent in the Valleys.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Apr. 9, 1935	Apr. 2, 1935	Mar. 12, 1935	Apr. 10, 1934
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$19.26
No. 2, Valley furnace.....	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti.....	19.13	19.13	19.13	18.13
No. 2, Birmingham†.....	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*.....	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.....	19.76	19.76	19.76	18.76
Basic, Valley furnace.....	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh.....	20.76	20.76	20.76	19.76
Malleable, Chicago*.....	18.50	18.50	18.50	17.50
Malleable, Valley.....	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago.....	24.04	24.04	24.04	23.54
Ferromanganese, seab'd car-lots.....	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	32.00
Rerolling billets, Pittsburgh.....	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	26.00
Slabs, Pittsburgh.....	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh.....	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh.....	38.00	38.00	38.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.....	1.70	1.70	1.70	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.80	1.80	1.80	1.75
Bars, Chicago.....	1.85	1.85	1.85	1.80
Bars, Cleveland.....	1.85	1.85	1.85	1.80
Bars, New York.....	2.13	2.13	2.13	2.08
Plates, Pittsburgh.....	1.80	1.80	1.80	1.70
Plates, Chicago.....	1.85	1.85	1.85	1.75
Plates, New York.....	2.08	2.08	2.08	1.98
Structural shapes, P'gh.....	1.80	1.80	1.80	1.70
Structural shapes, Chicago.....	1.85	1.85	1.85	1.75
Structural shapes, New York.....	2.05 1/4	2.05 1/4	2.05 1/4	1.95 1/4
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh.....	1.85	1.85	1.85	1.75
Cold-rolled strips, Pittsburgh.....	2.60	2.60	2.60	2.40

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. †Blue Eagle copper.

Finished Steel

Per Lb.:	Apr. 9, 1935	Apr. 2, 1935	Mar. 12, 1935	Apr. 10, 1934
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh.....	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary.....	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh.....	1.85	1.85	1.85	1.75
Hot-rolled sheets, No. 10, Gary.....	1.95	1.95	1.95	1.85
Wire nails, Pittsburgh.....	2.60	2.60	2.60	2.35
Wire nails, Chicago dist. mill.....	2.65	2.65	2.65	2.40
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.20
Plain wire, Chicago dist. mill.....	2.35	2.35	2.35	2.25
Barbed wire, galv., P'gh.....	3.00	3.00	3.00	2.85
Barbed wire, galv., Chicago dist. mill.....	3.05	3.05	3.05	2.90
Tin plate, 100 lb. box, P'gh.....	\$5.25	\$5.25	\$5.25	\$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.....	\$11.50	\$11.75	\$12.25	\$14.25
Heavy melting steel, Phila.....	10.00	10.25	10.50	11.75
Heavy melting steel, Ch'go.....	9.75	10.25	10.75	11.75
Carwheels, Chicago.....	10.50	10.50	11.00	11.75
Carwheels, Philadelphia.....	11.25	11.25	12.50	13.00
No. 1 cast, Pittsburgh.....	12.25	12.25	12.75	13.75
No. 1 cast, Philadelphia.....	11.00	11.00	11.00	13.25
No. 1 cast, Ch'go (net ton).....	9.00	9.00	9.50	9.50
No. 1 RR. wrot., Phila.....	10.75	10.75	11.00	11.00
No. 1 RR. wrot., Ch'go (net).....	8.00	8.00	8.50	9.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$3.85	\$3.85	\$3.85	\$3.85
Foundry coke, prompt.....	4.60	4.60	4.60	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery†.....	8.75	8.75	8.75	8.25
Lake copper, New York†.....	9.12 1/2	9.12 1/2	9.12 1/2	8.50
Tin (Straits), New York.....	49.25	48.00	46.80	55.80
Zinc, East St. Louis.....	4.00	3.90	3.90	4.40
Zinc, New York.....	4.35	4.25	4.25	4.75
Lead, St. Louis.....	3.50	3.50	3.40	4.15
Lead, New York.....	3.65	3.65	3.55	4.25
Antimony (Asiatic), N. Y.....	14.25	14.50	14.50	7.95

The Iron Age Composite Prices

Finished Steel

April 9, 1935	2.124c. a Lb.
One week ago	2.124c.
One month ago	2.124c.
One year ago	2.008c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	HIGH	LOW
1935.....	2.124c., Jan. 8;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$17.90 a Gross Ton
17.90
17.90
16.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1935.....	\$17.90, Jan. 8;	\$17.90, Jan. 8
1934.....	17.90, May 1;	16.90, Jan. 27
1933.....	16.90, Dec. 5;	13.56, Jan. 3
1932.....	14.81, Jan. 5;	13.56, Dec. 6
1931.....	15.90, Jan. 6;	14.79, Dec. 15
1930.....	18.21, Jan. 7;	15.90, Dec. 16
1929.....	18.71, May 14;	18.21, Dec. 17
1928.....	18.59, Nov. 27;	17.04, July 24
1927.....	19.71, Jan. 4;	17.54, Nov. 1

Steel Scrap

\$10.42 a Gross Ton
10.75
11.17
12.58

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1935.....	\$12.33, Jan. 8;	\$10.42, April 9
1934.....	13.00, Mar. 13;	9.50, Sept. 25
1933.....	12.25, Aug. 8;	6.75, Jan. 3
1932.....	8.50, Jan. 12;	6.42, July 6
1931.....	11.33, Jan. 6;	8.50, Dec. 29
1930.....	15.00, Feb. 18;	11.25, Dec. 9
1929.....	17.58, Jan. 29;	14.08, Dec. 3
1928.....	16.50, Dec. 31;	13.08, July 2
1927.....	15.25, Jan. 11;	13.08, Nov. 22

Miscellaneous Demand Supports Pittsburgh Output



Local Rate Remains at 35 Per Cent;
Valley Average Is Up Two Points to 52
Per Cent, and Wheeling Output Falls
to 77 Per Cent—Scrap Declines

PITTSBURGH, April 9.—Demand for finished steel for miscellaneous industries is offsetting diminishing tendencies in requirements of major consuming outlets. The automotive industry is buying steel sporadically in this district, with increased orders noted in cold-finished bars, strip steel and forging stock, and decreases in takings of sheets, merchant bars and wire. A fairly substantial movement of steel to the automotive industry will continue this month against old orders, but there is now some question as to whether demand later will be revived on a large scale.

At present, miscellaneous steel orders are running ahead of automotive tonnage, and the unusual steadiness of unclassified steel tonnage since the beginning of the year is sustaining producers' hope that mill operations will be spared drastic recessions until late in second quarter.

Passage of the huge Federal works relief bill will undoubtedly bring a fair measure of business to the local steel industry but is not being considered among prospects for early tonnage. Discussion of a proposed \$60,000,000 natural gas pipe line from the Texas-Panhandle district to Detroit has not aroused much interest among local pipe producers, despite intimations by Texas officials that the project might be one of the first to be considered in the relief works expenditures.

Tin plate mill schedules are being affected only moderately by a lull in specifying and this week will drop about 5 points to between 80 and 85 per cent. Sheet production is holding at 65 per cent, as is strip steel output at 50 per cent.

Raw steel output in the Pittsburgh district remains steady at 35 per cent. Minor revisions at smaller independent mills have been offset by a slight increase in production by the leading producer. Scattered improvement in automotive buying has sponsored

a two-point rise in production to 52 per cent in the Valleys and nearby northern Ohio mills. Output in the Wheeling district is off 8 points at 77 per cent.

No. 1 heavy melting steel at Pittsburgh is off 25c. a ton.

Pig Iron

Talk of higher pig iron prices next quarter as a result of the impending higher freight charges on coke, ore and limestone is being discounted in this district. The extent of the increase in producing costs is not yet measurable, as the surcharges to be applied to limestone and ore have not been definitely determined. On ore, for instance, there is talk of increasing handling charges in addition to assessing higher freight tariffs. Despite these prospective increases, it is considered questionable whether pig iron producers will eventually endeavor to pass the additional freight charges in raw materials to consumers, who also will be taxed with additional freight on pig iron shipments. Furthermore, higher prices would tend to keep demand at a minimum, and divert consumers to a greater use of secondary material.

Semi-Finished Steel

Demand remains on a fairly even keel with consumption of sheet bars by detached tin plate mills holding at an unusually satisfactory rate. Shipments of sheet bars to non-integrated sheet mills are tapering slightly. Small lots of skelp are moving regularly. Forging stock is in moderately heavier demand as a result of scattered increases in automotive buying.

Bolts, Nuts and Rivets

Volume of orders varies slightly from week to week. Tonnage, though disappointing in the aggregate, is well diversified. The railroads and construction industry are not taking their usual share of deliveries this season, while shipbuilding is accounting for only a small part of the total move-

ment. Prices appear to be well maintained, and are expected to be more rigidly adhered to when producers will have to absorb higher materials costs after freight surcharges are established this month.

Rails and Track Accessories

Despite the granting of higher freight tariffs on April 18, the carriers are not expected to expand track work to a point where mills will benefit unusually from new rail and track accessory orders. The current tenor of railroad demand is discouraging, as it implies fairly general adherence to hand-to-mouth buying policies.

Reinforcing Steel

Passage of the Federal works relief bill is expected soon to guide State and county governments in their spring road construction programs, which had been deferred pending enactment of the relief bill. Allocations for road work still are not definite, and road construction this year possibly will lag behind seasonal schedules. Meanwhile, reinforcing bar producers in this district are receiving a moderate influx of specifications for shipment to projects under construction. Minor releases are being received for jobber stocks.

Cold-Finished Bars

Orders for shipment after April 10, when reduced base prices will become effective, have appeared in fairly heavy volume. The largest requirements are being specified by parts makers and motor car manufacturers. New zest also has appeared in demand from agricultural implement makers. Miscellaneous interest is well sustained, and jobbers will take a slightly larger share of the movement after April 10. Including orders booked for shipment after that date, April tonnage thus far is ahead of early March bookings.

Plates and Shapes

Structural awards reported in this market for the past week were in better volume. The largest part of the awards involved structural shapes for Tennessee Valley Authority projects. McClintic-Marshall Corp. will furnish 350 tons for the Stephen Foster Memorial building, University of Pittsburgh. Fresh specifications continue to appear in small volume.

The plate market is quiet, with a substantial tonnage for barge construction still pending. The railroads and tank erectors are not active.

Tubular Products

Demand is sustained. Practically all the major outlets for tubular

products are specifying regularly for moderate lots. Seasonal expansion in some consuming lines has not appeared. Unquestionably, a fair demand for pipe will accrue in the launching of the Federal works program, but cannot be included in the early outlook. Drilling in the oil fields is on a greater scale than a year ago, but such activity has not yet sponsored a heavy movement of drill pipe, casing and tubing. Electric weld mechanical tubing is going steadily to automotive centers.

Bars

Pressure for lower prices has naturally followed the \$3 a ton reduction in cold-finished bars, but thus far producers have turned a deaf ear to suggestions for cutting merchant bar quotations. The maintaining of a wider spread than now exists between merchant bars and cold-finished bars is a debatable subject, according to some producers, as the application of extras to cold-finished stock still provides a comfortable working margin. Measured by consumer demand, the market generally is not being affected by discussions of prices. Orders are slightly heavier in some directions, with miscellaneous demand the most encouraging feature.

Wire Products

The seasonal pace of shipments to the farm regions has not been reached, as indicated by wire mill bookings in this district. Mills farther inland seem to be faring better from the spring demand. Automotive demand still is accounting for a fair share of current activity, and opinion persists in some quarters that heavier shipments will be dispatched later this month. Mill operations in this district are holding at about 40 per cent, or about ten points behind the country's average wire output.

Coke and Coal

Production of bituminous coal continues to recede, and operators expect no reversal in the current trend until negotiations for wage contracts are resumed. The amount of increased costs that will result from the freight surcharges is not considered generally sufficient to stimulate anticipatory covering, as storage yards are fairly well stocked and any saving in freight rates might quickly be offset by demurrage accruals. The heavily stocked positions of most consumers for the next 30 to 60 days is tending to divert any anxiety over the wage controversy, which must be settled by June 16. The only apparent "shortage" is reported in slack coal, the production of which

is declining rapidly in the absence of seasonal screening for domestic sizes. Coke demand is lifeless.

Sheets

The volume of automotive buying of full-finished sheets in the past week narrowed, while miscellaneous orders tended slightly higher. The placing of additional heavy orders by the automotive industry is considered conjectural, as most of the large motor car makers are well covered for sheets this month, and in other directions the policy seems to be to liquidate stocks so far as possible before replenishing. Demands from the container industry are growing smaller. The change in aggregate demand for sheets, however, is not yet sufficiently marked to affect production, which this week is expected to hold at 65 per cent.

Tin Plate

Although the flow of new specifications has slackened perceptibly in the past fortnight, mill schedules have not been seriously affected. Output this week probably will drop about five points to between 80 and 85 per cent. The present trend in activity is not interpreted as initiating a continued recession, as the peak of tin plate demand probably will not be reached for another month or two. General line and packers' can requirements this year are expected to exceed those for 1934 by a comfortable margin.

Strip Steel

A small improvement is reported in automotive buying, traceable largely to heavier placements by Chevrolet and Chrysler. Strip producers are rather sanguine of continued covering by motor car and parts makers for at least the remainder of April. Farm implement makers are placing tonnage sporadically, with volume in the past week running slightly ahead of the preceding week's business. Strip production is expected to be sustained this week at around 50 per cent.

Scrap

Steel-making grades have weakened, with prices averaging 25c. a ton lower. No. 1 heavy melting steel this week is quotable at \$11.25 to \$11.75. That grade on the recent Pennsylvania Railroad list was sold at \$11.75, Pittsburgh district, to brokers to be applied to the tonnage against unfilled orders. Some brokers are expressing willingness to sell No. 1 steel at \$11.50, but this figure is not broadly representative of the present market. Compressed sheet steel is notably weak at \$11 to \$11.50. A round tonnage of heavy breakable

cast has been sold at \$11.50, delivered this district. Little demand exists for blast furnace scrap. Specialties are surprisingly well sustained at \$14 to \$14.50, the lower figure representing the price paid by dealers on the last Baltimore & Ohio list.

Demand Sustained In South

BIRMINGHAM, April 9.—Production of steel and iron in the Birmingham district went into the second week of April with schedules unchanged. Steel production has been unchanged since Feb. 12, when the Tennessee Coal, Iron & Railroad Co. reopened its rail mill.

This company now has three blast furnaces and five open-hearth furnaces in operation at its Ensley works and two blast furnaces and four open-hearth furnaces in production at its Fairfield works.

The South is still furnishing an active market for sheets, both galvanized and special finishes. The special finishes, which are not made in this district, are going almost entirely into stove manufacturing. Demand for roofing material also has kept the sheet market rather buoyant. Wire products are showing more activity than was expected for this time of the year.

Shipments of merchant pig iron are fairly good, running about the same as in March, which was better than February. There are four stacks in the district making merchant iron.

Pressure pipe orders, while still lagging, have increased in the past week or ten days. Manufacturers of the district have been able to lift production to around 40 per cent.

New Orleans has divided 4100 tons between National Cast Iron Pipe Co. and United States Pipe & Foundry Co. It is understood that the latter company also will supply 2000 tons for work to be done at Nashville, Tenn.

The Gulf States Steel Co., with plants at Gadsden, has three open-hearth furnaces in operation, with no change in production schedules contemplated for the near future. This makes a total of 12 open-hearths active in the district.

Recent fluctuations in the scrap market have not affected this district, and prices, although slightly weaker this week, have not been changed. Dealers have ample stocks in their yards to take care of the present production needs without difficulty.

Chicago Rate Is Off a Half A Point to 50 Per Cent



Recession in Steel Bookings Is Slight—
Railroad Supply Makers Buy Pig Iron—
Steel Scrap Finally Breaks 50¢ a Ton

CHICAGO, April 9.—Finished steel bookings are not as large as a week ago, but backlogs and releases against them are carrying ingot output forward at only a half point drop, that is to 50 per cent of capacity. Inquiries are growing more spotty and mill operators, recognizing that shipments are in excess of new business, either at hand or in prospect, have come to the belief that the late spring and early summer recession in demand will soon catch up with them, and that the general gradient of mill operations will be downward from near the end of April on into the summer months.

Releases and new requirements of automobile manufacturers are steadily growing more irregular, though the aggregate tonnage is satisfying in view of conditions in general. There is a slight indication of slackening in agricultural implement schedules, but the change is so small and it has been in effect such a short time that it cannot as yet be taken as a definite trend.

Structural business and orders for reinforcing bars afford a brighter side of the market. Structural steel, though sluggish at the moment, can be counted on to pick up with new Government expenditures. In reinforcing bars there is a striking contrast with previous months in the proportionately important place that private enterprise is taking.

Pig Iron

A manufacturer of railway supplies has placed orders for 5000 tons of basic iron, and a similar concern at St. Louis is in the market for 10,000 tons. Railroad business in sight does not seem to warrant such tonnages, and some are of the belief that a real move is starting to put surplus cash into commodities as a hedge against the threat of inflation. Most malleable foundries remain very busy on automobile work, but some drop is

noted in units that supply parts to agricultural implement manufacturers. Demand from roll makers is adding new life to charcoal iron demand. Two charcoal furnaces are lighted. Prices remain stable and, notwithstanding advances in freight rates, there are those in the trade who profess not to see higher quotations in the second quarter.

Cast Iron Pipe

The placing of about 1000 tons, mainly fittings, for the Sanitary District of Chicago, awaits the award of the general contract. Herlihy Mid-Continent Co., Chicago, is low bidder. Shipments against old PWA jobs are moving more freely with the arrival of favorable weather, but new inquiries for pipe are light.

Cold Finished Bars

Chicago base prices will be lowered \$3 a ton effective April 11 at which time quotations will become \$2 per 100 lb. Demand, as gaged by shipments, is steady but new orders are beginning to drag.

Reinforcing Bars

Private work is leaping into the foreground with the award of 800 tons for Olson Rug Co., Chicago. Small jobs of a wide variety are numerous and with open weather prevailing reinforced concrete construction is moving ahead at a rate which is sustaining shop operations at 75 per cent of normal capacity. Some preliminary figures are being taken on Chicago housing projects and it is reported that final drawings are well advanced. Contractors who have signed orders for road work still show little interest in the market. Some of them may still be hopeful that lower prices on bars will prevail, but the major reasons now holding back releases of tonnages are cold weather and in some sections excessive moisture, which makes working conditions costly. Low

bidders have been announced on 6500 tons for Sanitary District work.

Sheets

Mills continue to hold output in the range from 70 to 80 per cent of capacity. Books on the cold-finished products are affording capacity output, while hot mill orders are variable and pull down average output. Taken all the way down the line, orders are slowing up and new bookings are not equal in tonnage to shipments. The character of new business leads producers to the conclusion that the peak of output has been reached and that the time is not far distant when rolling schedules will begin to taper.

Rail and Track Supplies

The Illinois Central, which a month or more ago was expected to come out with a program, has still made no open move. The Milwaukee Road has in mind making a purchase, but it may be deferred until later in the year. Nearby prospects for new tonnages lie with several railroads that operate between Chicago and the East coast. Mill outputs have been stepped up slightly and bookings are sufficiently heavy to carry the present rate of operations forward through May and part of June. Accessory business is making slow but steady headway.

Wire Products

Total figures for March show that it was the best third month of the year since 1930. Current orders are liberal as measured by March, though they lack the snap that is usually experienced at this time of year. Mills have not yet felt a reaction from Western dust storms. This is probably due to the slack taken up by local jobbers and the fact that after all business in wire products is not of large proportions in the areas that have been devastated. Reinforcing mesh is starting to move but large shipments await highway departments' knowledge of Federal aid programs. Copper wire products are moving slowly. Railroad demand for wire products remains very light. All manufacturing lines remain steady and they form a real backbone for this market.

Plates

Some tonnage is moving to railroad shops that are preparing to start car building programs, and limited quantities of plates are being taken for water tanks. All other phases of the market are

quiet. Allotment of funds for dams on the Mississippi River will bring tonnage to makers' books, as will the Texas-Detroit gas line, which has advanced to the point where a bill promoting the project has been introduced in the Texas legislature.

Structural Material

Awards of about 1000 tons are light and new projects, except for the predominance of private work, are little more attractive. All eyes are centered on Fort Peck where the low bidder has been announced on 20,000 tons of structural steel and reinforcing bars. Bids will be opened April 11 at St. Louis on the Alton, Ill., dam.

Bars

Some automobile manufacturers have resumed buying on a liberal scale, while others appear to have adequate supplies for the immediate future. Releases by farm implement manufacturers indicate steady production schedules. An interesting development in the bar market is the insistence on the part of many consumers of far closer tolerances than were demanded even a year ago.

Scrap

Consumer pressure for lower prices is having its effect and heavy melting steel is quotable in the range from \$9.50 to \$10.00 a gross ton delivered. A small lot has been purchased by a mill at \$10. Supplies of most grades are more than ample. The Wabash, the Milwaukee Road and the Chicago and North Western have recently sold large lists, but this week railroad offerings are light. Old orders on brokers' books are not large, but at the rate at which mills are accepting shipments many orders will not expire for six weeks or longer.

The annual "Exhibitors' Night" of the Purchasing Agents' Association of St. Louis will be held April 23. This is a local counterpart of the Informashow staged annually by the National Association of Purchasing Agents. Exhibits will be shown in the Gold Room of the Jefferson Hotel.

William D. Sargent and E. B. Smith, receivers, Eastern Steel Castings Co., Newark, N. J., held open house on March 29 to observe completion of 25 years' continuous operations by company.

Bethlehem Earnings \$550,000 In 1934

NET income of the Bethlehem Steel Corp. in 1934 was \$550,000, it was revealed at the annual meeting held at Newark, N. J., on April 9. This compares with net losses of \$20,000,000 in 1932 and \$9,000,000 in 1933. Operations in 1934 averaged 35 per cent of capacity. In the first quarter of this year they averaged 39 per cent, as compared with 38.7 per cent a year ago and 15.8 per cent in the first quarter of 1933.

Eugene G. Grace, president, reported that in January, 1932, the corporation held in cash and Government securities \$50,279,000, while in January, 1935, this had been increased to \$50,875,000. He stated that there was nothing to indicate an increase in operations during the present quarter, but hoped that "things would continue steady." It was revealed that directors are actively considering the refinancing of the company's

\$53,000,000 bonds, which mature in the first half of 1936 as well as the balance of the company's debt.

Mr. Grace stated that the new plant to be built at Lackawanna will add great strength and earning power to the corporation. He called attention to the company's large capacity in the heavier rolled products and said that Bethlehem had never had sufficient capacity in the lighter products. "The new sheet and strip mill," he declared, "should produce at a cost of \$6 to \$8 a ton less than the company now produces by the older and obsolete methods."

A number of stockholders protested against the salaries of President Grace and Chairman Schwab, which were reported to be \$180,000 and \$250,000 annually respectively. A motion for a limitation on their salaries was defeated by a vote of 355 shares for to 2,370,220 against.

Trade Publications

Diamond Dressing Tools.—Koebel Diamond Tool Co., 1222 Oakman Boulevard, Detroit. Leaflet devoted to important factors in buying dressing tools.

Presses.—Niagara Machine & Tool Works, Buffalo, N. Y. Folder describing improved features of A-5 heavy-duty presses, including the new one-piece steel casting frame. Illustrations are large, and data include specifications and dimensions.

Gun Welders.—Thomson-Gibb Electric Welding Co., Lynn, Mass. Bulletin giving data on the recently announced gun welder, which combines extreme portability with flexibility of application.

Core Drills.—Ingersoll-Rand Co., 11 Broadway, New York. Attractive 48-page bulletin devoted to features and uses of Calyx core drills, with which holes up to 72 in. in diameter and 50 ft. deep can be drilled and the cores removed for study. Smaller holes, up to 11½ in. in diameter and as deep as 2500 ft., can also be produced.

Electric Equipment for Power Shovels.—General Electric Co., Schenectady, N. Y. Twenty-page illustrated booklet covering development of the power shovel and facts concerning modern shovel drives.

Gilmore Steel & Supply Co., 825 Folsom Street, San Francisco, has been made a warehouse distributor of Enduro stainless steel, made by Republic Steel Corp., Youngstown.

Declaration of \$9.50 a share in dividends on the preferred stock of the American Rolling Mill Co., Middletown, Ohio, has been made. This will result in payment of

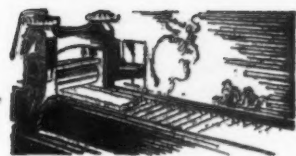
all dividends in arrears and includes the quarterly disbursement for March 31. Payment will be made April 15 to shareholders of record April 15. Consolidated statement of the company for 1934 showed net income of \$966,566, after depreciation, interest and Federal taxes. Accumulated preferred dividends amounted to \$116,580. This resulted in \$849,986 net for common stock, equal to 50c. a share. This compared with a net loss of \$789,089 in the previous year.

Ford to Buy Tools For Glass Plant

DETROIT, April 9.—The Ford Motor Co. is about to place orders for 120 grinders and 200 polishers for its glass factory which will resume the manufacture of glass next winter. These machines plus auxiliary equipment will involve an expenditure of over \$1,000,000. Inquiries for this machinery were put out several weeks ago.

A stainless steel leg base for use with metal filing cabinets has been developed by the Globe-Wernicke Co., Cincinnati. It is understood that this is the first use of stainless steel for a product of this kind. According to H. H. Wittstein, vice-president in charge of sales, the new leg base is easy to keep clean, bright, and sanitary, will not rust or corrode, and always retains its original lustre and finish.

Steel Demand Falls Off In New York District



Buying Is From Hand to Mouth—Public Works Projects Loom as Main Reliance for Tonnage Business

NEW YORK, April 9. — Demand for finished steel has fallen off sharply. Evidently convinced that whatever changes are made in NRA or the steel code will benefit the steel buyer rather than the steel maker, the consuming trade is postponing all except imperative purchases. The increase in freight rates on finished steel which, according to latest reports, will go into effect April 18, will amount to 7 per cent with a maximum of 2c. per 100 lb. except on very long hauls, and is not considered a sharp enough advance to warrant anticipatory buying. Prospects of higher steel prices because of increased raw material costs under the new rates are not yet causing much concern because, under the code, no price advances can be filed on business for shipment in this quarter.

Public expenditures continue to be the industry's principal reliance for tonnage business. Bids will be taken in a week or ten days on another span—a lift span—for the Triborough bridge, New York, which will require 15,000 tons of structural steel. Another Triborough span, calling for 10,000 tons, will come up for bids about the middle of May. Tenders will soon be received on 7000 tons of sheet steel piling for the Boston army base.

The city of New York has bought 1325 tons of water pipe for the Bronx and 1360 tons for Queens which will be fabricated from steel plates. The city is completing plans for two additional sections of the west side elevated highway which will take considerable steel. One section will be built below Canal Street and the other in the "midtown" part of New York. The State of New York will be allotted \$49,000,000 under the last Federal relief appropriation for highway work and grade crossings. It is understood that the State of New Jersey will receive Federal funds in substantial amount for grade separation work and that railroads in that

State also have extensive plans for grade crossing elimination.

It is expected that the new Naval bill will provide for the construction of one aircraft carrier, five cruisers, 12 destroyers and six submarines.

Pig Iron

Foundry business shows so few signs of improvement that most melters are making no attempt to stock iron to avoid the higher prices which are in the immediate offing as the result of emergency advances in freight tariffs. Most sellers report a greater volume of shipping instructions on old contracts, but new business is currently less plentiful than in previous weeks. Only 1250 tons of iron was placed in the past seven-day period, as compared with 1900 tons in the preceding week and 1650 tons booked a fortnight ago. Although no railroad has officially announced its plans regarding emergency tariffs, the trade expects the charges to go into force April 18. These charges for iron are to be 7 per cent of the basing point rate up to a rate of \$6.40; any rate over this level will call for a flat 2c. per 100 lb. emergency charge. The emergency charges will result in an advance of 15.89c. per gross ton for iron delivered at Brooklyn, and 9.73c. for iron delivered at Jersey City, N. J.

Cast Iron Pipe

Fresh small-lot inquiry is in very small volume, and the temporary slackening of Federal allotments has resulted in fewer tonnage projects. United States Pipe & Foundry Corp'n. was awarded 500 tons for a Staten Island project and 500 tons for PWA construction in New York. Additional contracts aggregating about 2500 tons will shortly be placed by PWA contractors for installation in New York.

The current market is featured

Reinforcing Steel

by a fair volume of miscellaneous small-lot demand and, in addition, there is about 1000 tons active for large projects. Pending awards include 400 tons for sewage treatment plant No. 2 at Washington, on which bids are due April 22, 400 tons for a wholesale market house in the Bronx, 150 tons for a hospital addition at New Brunswick, N. J., and 200 tons for a Union County, N. J., highway project.

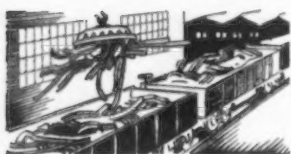
Scrap

This market has steadied appreciably despite the continued absence of domestic business and the slackening of fresh foreign demand. A little stove plate continues to move to New Jersey and occasional carlots of less important grades are being delivered into eastern Pennsylvania. Otherwise the domestic market is inactive, and brokers believe this condition will persist for the better part of the second quarter. Brokers' purchases to cover standing export commitments are in undiminished volume, with dealers supplying fair tonnages of materials at present price levels. No. 1 and No. 2 steels continue to bring \$9 and \$7.25 a ton, respectively, alongside barges; unprepared yard iron and steel has dropped to under \$4.50, and most brokers are unwilling to pay over \$6 for stove plate for either domestic or foreign delivery. Heavy steel is still being loaded for Japan and Italy, a little stove plate and cast are going to England, and Poland is again receiving steel. The much flaunted war preparations of Europe have not influenced new scrap purchases here to any extent. Foreign buyers continue to offer orders at prices lower than most brokers are willing to accept in view of the unsettled condition of foreign exchange and shipping facilities and the possibility of a domestic price recovery late in the second quarter.

Scrap Prices Lower In Detroit District

DETROIT, April 9.—With an abundance of scrap continuing to pour out of automotive plants and light demand on the part of consumers, prices of several items have given ground in the last week. The local steel plant has bought a small tonnage. Ford is laying down in its yards at Rouge sizable quantities of scrap received from body supplies and produced by its own departments.

Philadelphia Rate Off One Point; Scrap Declines 50c.



Sellers Here Warn Customers to Take Steel Before April 18 — Building Demand Continues Almost Inactive

PHILADELPHIA, April 9.—Local sentiment on the part of mills has rebounded somewhat from the abysmal depths typical of the past few weeks. Total credit for this reaction may be attributed to the \$4,880,000,000 public works appropriation, for the immediate outlook in this area is far from satisfactory. Whereas most of the smaller mills continue to melt steel in unchanged, but very small, volume, the largest district producer has taken off several furnaces, thereby driving the district rate down one point to 32 per cent of capacity.

Pennsylvania and nearby states will have over \$70,000,000 of the public works appropriation to spend for grade crossing elimination and general highway construction. Steel purchases for this construction should be quite sizable, but the money will not be available until late summer. Consequently no uplift in steel production from this source will occur before the fall. In the meantime, district producers must necessarily subsist on the small volume of miscellaneous business which has been the only support to this market since the turn of the year.

The new emergency railroad freight rates are to become effective on April 18. Steel deliveries after that date, for both spot and contract business, will carry price advances varying up to a maximum of 44.8c. a gross ton, depending on the basing point line haul charge to the delivery point. Although these charges add one more burden to the steel consumer—and also to the producer—they are not of such magnitude to influence heavy forward purchasing. Buyers are making somewhat heavier releases on contracts and also stocking May requirements more freely. But there has been no tendency to stock June and third quarter supplies.

Producers of bolts and nuts are now quoting 70, 10 and 5 off list. A slight buying wave occurred the last week of March prior to the advance, but the present market is entirely devoid of demand. Consumers are judged not to be great-

ly stocked, as the price advance was not stiff enough to influence heavy forward coverage. Nevertheless this market will probably continue inactive for at least another month, after which a moderate day-to-day demand should again appear.

Pig Iron

New emergency freight rates will result in an advance of 5.32c. for foundry grades delivered at Philadelphia after April 18. A number of large tonnage users have placed orders for immediate shipment, but smaller foundries are ignoring the forthcoming advance. Oddly enough, current sales of iron to small producers are under the volume of several weeks ago, and the trade is of the opinion that there will be no marked upturn in sales over the remainder of the quarter. This attitude is fostered by the poor outlook for jobbing foundries and the continued low price of good quality cupola scrap.

Sheets and Strip

This market continues unchanged from previous weeks. Local autobody stamping works continue to receive heavy shipments from the West and are only buying sparingly in the local market for nearby shipment. Consumer demand for cold-rolled strip continues spotty and of a carlot variety. Both mills and warehouses report a sustained demand of fair proportions for galvanized sheets, mostly as a result of routine spring rehabilitation of the many small manufacturing plants of this area. It is rumored that jobbers' discount on galvanized sheets will be advanced from \$2 to \$4 a ton. Such action would necessitate a revision of distributors' discounts, and in all probability a change in black sheet prices.

Bars, Plates, and Shapes

Impending emergency freight charges will lift plates, shapes and bar prices to 1.99c., 2.01c. and 2.11c., respectively, delivered in the Philadelphia area. Although these advances will work some hardship on users, they are so

small that they will not alter the market set-up here seriously. Reinforcing bars are almost inactive, with only a spotty flow of small tonnages to support the market. The one active project of any consequence in this area calls for 400 tons for a sewage treatment plant at Washington, on which bids are due April 22. Plates likewise are in poor demand. No disposition has been made of the Erie ferryboat tonnage, and it will be some time before steel for the two oil tankers for the Gulf Refining Co. will be bought. There was no award of structural shapes of any consequence during the past week. One new project calls for 200 tons for a home for the Friends Society, on which bids are due April 17. Now that the Government has more money at its disposal, local steel sellers are hoping for an early award on the long pending 5000 tons required by the Library of Congress addition at Washington.

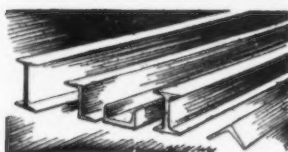
Imports

The following iron and steel imports were received here last week: 4000 tons of chrome ore from Portuguese Africa and 1543 tons of the same product from Cuba; 99 tons of ferromanganese from France; 82 tons of steel tubes and 25 tons of steel bars from Sweden, and 8 tons of structural shapes from Belgium.

Scrap

The difficulty of securing export boats has resulted in such large accumulations of No. 1 and No. 2 steels at Port Richmond that the principal broker is temporarily withholding shipments and has stopped buying these grades. In the past the steady export purchases have supported prices, notwithstanding the inactive domestic situation. Two domestic sales featured the market during the week. One moderate tonnage of No. 1 was placed at \$10, and Alan Wood took about 2500 tons of No. 2 at \$9.50. Thus No. 1 is quotable at the \$10 level, but No. 2 is retained at \$9 in view of the weak condition of the present market. Axles have been sold as low as \$16, Birdsboro has purchased short turnings at \$6, hydraulic compressed bundles are down \$1 a ton in sympathy with heavy steel, and stove plate is being sold in fair quantities at \$8.25. Just how far heavy steel prices will decline because of the withdrawal of export support is problematical. Present accumulations will probably not be cleaned up for at least a month, and there is not much likelihood of domestic demand of any consequence during the same period.

Output Off Two Points to 54 Per Cent at Cleveland



Demand for Finished Steel Holds at Volume At Which It Recently Leveled Off—Freight Rate Increase Stimulates Pig Iron Shipments

CLEVELAND, April 9.—Ingot output in the Cleveland-Lo-rain territory this week dropped back two points to 54 per cent of capacity, losing the gain it made last week. New demand for finished steel remains at about the volume to which it recently leveled off.

Automobile manufacturers continue to order sheets quite freely, but not in as large quantities as a few weeks ago. Sheet mills are well filled for April shipment and are maintaining recent operations. Considerable of the new demand is now for May delivery. Makers of automobile stampings and forgings are able to maintain good schedules, but are not being crowded for deliveries as they were recently.

There is a fairly steady volume of orders for bars and other steel products from miscellaneous consumers. Buyers are limiting purchases to early needs. The advance in freight rates is not expected to stimulate orders, as it is not believed that the advance will be sufficient to warrant consumers to place steel in stock in excess of their current needs to save on freight.

The Erie Railroad has issued an inquiry for its 1935 rail requirements without stating the quantity that it will buy. However, this road is expected to purchase about 15,000 tons. Prospective rail business includes several thousand tons from the Akron, Canton & Youngstown Railroad. Miscellaneous demand from railroads is light.

Public work in the construction field is limited to the Muskingum district conservation project. Other public activities are awaiting the procurement of Federal funds. Structural mills are getting some orders for plain material for jobs placed some time ago.

Bars, Plates, and Shapes

Bars are moving in fair volume to manufacturers of automobile parts and agricultural implements. Plates are in moderate demand from tank builders. Boiler shops are quiet. Activity in the building

field is very limited. Additional dam work requiring 687 tons of reinforcing bars in connection with the Muskingum district conservation project is out for bids. The Cleveland Federal housing project will require 250 tons of angles for lintels.

Pig Iron

The advance authorized in freight rates seems to have stimulated shipping orders, as they gained during the week. Sales also increased. One Lake furnace interest sold 5000 tons, or nearly twice as much as during the previous week. Among other sales were three 500-ton lots of foundry iron, including one lot of Southern iron to consumers in this district. New business is mostly from non-automotive sources, automobile foundries having previously covered for fair tonnages. With the Lake furnace cost of making iron increased 40 to 50c. a ton by the advance in freight rates on raw materials, foundries see the possibility of higher prices for the third quarter and may order iron more freely for stock than they have recently.

Freight Rates

A badly muddled situation in respect to freight rates has resulted from the emergency rate advance authorized by the Interstate Commerce Commission. The new rates, which apply to pig iron, steel products, iron ore, coal and coke, are now scheduled to become effective April 18 on interstate traffic.

The Public Utilities Commission of Ohio will hold a meeting April 16 to determine whether to allow the rate advance on intrastate traffic. Meetings also will be held shortly by rate-controlling bodies in other States, and some of the State commissions are reported to be opposed to granting any rate increase for intrastate traffic. In case States refuse to allow a rate advance, the Interstate Commerce Commission has authority to compel the States to make advances to avoid discriminatory rates. However, that would mean long delay in settling intrastate rates.

The advance allowed in the ore rate, which is 11.2c. per gross ton, will be charged by the Northern railroads for hauling all ore from the mines to the upper Lake ports. If the ore is to go from a lower Lake port to an interior furnace, the first rail carrier may divide the increased rate with the lower Lake railroad. There is talk that Ohio railroads may refuse to advance the rate on Ohio coal, and in that case roads hauling coal from competitive districts might stick to their present freight rates.

Sheets

New business continues to come from the automotive industry in fair volume. Refrigerator manufacturers are specifying freely and expect to be able to maintain present production schedules for two months. Business from stove manufacturers has tapered off somewhat. Most stamping plants making automobile parts are taking good shipments. Demand from the building field is slack.

Strip Steel

Orders from automobile and parts manufacturers are rather light. Some of the latter still have considerable steel to be shipped against contracts and are buying only small fill-in lots. Hot-rolled strip is moving in fair quantities to refrigerator manufacturers and other makers of household equipment.

Iron Ore

Shipments from Lake Erie docks during March were 298,780 tons, as compared with 204,900 tons during March last year. Shipments from these docks for the season were 11,783,677 tons, as compared with 12,353,706 tons the previous season. The dock balance April 1 was 4,569,298 tons, as against 4,981,536 tons on the same date a year ago.

Scrap

Consumers still have good stocks and are showing no interest in further commitments. There is no demand for scrap for shipment to local mills, as dealers have their orders filled. Blast furnace grades have declined 25c. a ton. Other grades are unchanged, but untested.

The New York district sales office of Republic Steel Corp. will be removed to the Chrysler Building, effective May 1. W. H. Oliver continues in charge of the office as district sales manager. Republic's export department, under the direction of D. H. Bellamore, general export manager, will also occupy a portion of the new offices.



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Pig Iron Shipments Gain at St. Louis

ST. LOUIS, April 9.—The emergency freight-rate advance, scheduled to become effective April 18, has caused a marked stimulation of shipping instructions against contracts for pig iron, and has brought out some new business, although not a great deal as yet.

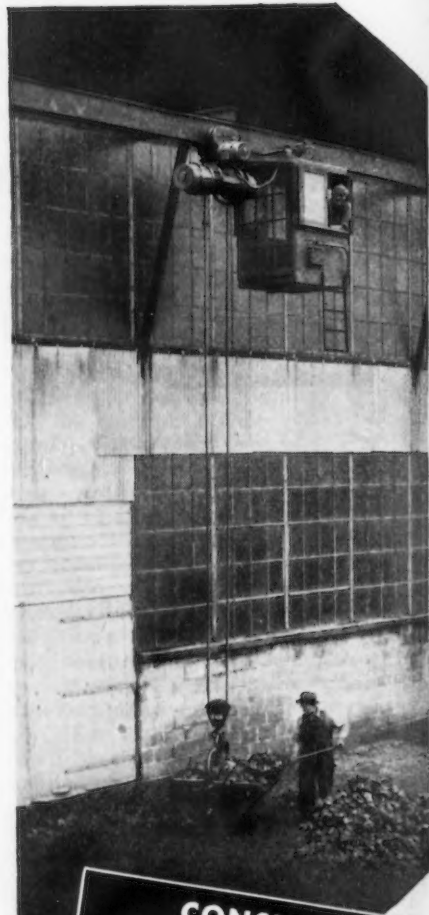
The seven largest stove foundries in the Belleville district are said to be operating at between 65 to 70 per cent of capacity, which is high for this time of year. Reports from Quincy give a similar rate of production. Gas ranges and circular heaters, the latter for mail order houses, constitute the bulk of the production. There has been a slight let-up in the operations of the large implement manufacturers.

Bids will be received April 11 for grading approaches to the Wabash Railway bridge across the Missouri River at St. Charles, requiring 56 tons of structural steel and 29 tons of reinforcing bars, and on April 24 for the approach substructure, requiring 158 tons of reinforcing bars. Bids are expected to be asked shortly for the superstructure, which will require between 8000 and 8500 tons of structural steel. Refrigeration units for the St. Louis Municipal Auditorium will require 225 tons of sheets; the contractor is Ingersoll-Rand, Inc. Fielding & Shepley-Addison & Miller, St. Paul, are the low bidders on the general contract for the Fort Peck, Mont., dam project, requiring 11,000 tons of reinforcing bars.

Plans for the superstructure of the St. Louis post office have been approved in Washington, and bids will be asked for May 11. It is estimated that between 7000 and 8000 tons of structural steel will be required. Klipstein & Rathman are architects and W. K. Knight & Co., engineers.

Warehouse business for March was very satisfactory, a gain of 25 per cent over the same month last year being reported, principally as a result of an increase in building projects. Mills report buying on a restricted scale, due to uncertainty as to the future of the NRA. Movement of wire products and roofing to the farming districts continues, but the volume is disappointing.

The scrap market is weaker, as a result of a lack of buying by the mills. Declines of 50c. a ton were recorded in cast iron borings and shoveling turnings, machine shop turnings and cast iron car-wheels. A list of 1000 tons of miscellaneous scrap iron sold by the Missouri-Kansas-Texas Railway is said to have gone to other markets, some of it for export.



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Tin Prices Continue to Advance and Spelter Is Marked Up \$2 a Ton

NEW YORK, April 9.—Interest in the copper market is still centered in Europe, where the recent advance in prices is continuing. While some profit taking develops from time to time, the market is quotable today at 7.70c. to 7.75c. a lb., usual Continental base ports, and it is not unlikely that the 8c. level will be reached this week. This is the goal of foreign producers and the 1c. differential between the foreign and Blue Eagle price will likely be maintained for a time. A number of producers in this country would like to see 10c. copper, but it is believed that demand must reach a higher level before an increase is attempted. April domestic sales

through yesterday totaled 7350 tons, reflecting a slight decline from the high rate of activity in the closing days of March. However, consumption is believed to be sufficient to assure sales of the code book again this month.

Lead

The market is without feature, but sales are continuing at a good rate and quotations are very firm at 3.65c. a lb., New York, and 3.50c., St. Louis. Foil manufacturers have been in the market in the last week and other consumers continue fairly active. Retail sales of paint are the best since 1930 and the industry expects to oper-

ate at a satisfactory level throughout the summer. The lead ore market is firm at \$35 a ton for small lots, with a \$3 a ton premium asked on large quantities.

Tin

The upward trend in tin prices which began about three weeks ago continues unabated. The market at New York yesterday was quotable at 49.50c. a lb. and is only slightly lower today. This represents a net advance of 4c. a lb. from the low reached as a result of the commodity market scandals in London. The situation abroad is now believed to be satisfactorily adjusted and pool activities are again an important market factor. Demand in New York is confined almost entirely to spot metal but is fairly active. Tin plate mills are running at a high rate and are only beginning their period of seasonal activity. Standard tin was quotable in London this morning at £224 10s. for spot metal and £220 15s. for futures. Straits was held at £231, and the market in the East was quotable at £226 10s.

Zinc

Increased production costs brought about by the code and the publication of very satisfactory March statistics led to a \$2 a ton advance in spelter prices yesterday and the market is now quotable at 4c. a lb., East St. Louis, and 4.35c., New York. This is the highest level reached since last September and it is believed in the trade that even higher prices are in prospect. Sales last week amounted to more than 4000 tons, exceeding the expectations of most producers, and demand continues active. March statistics revealed a decrease in stocks of almost 5000 tons. Shipments amounted to 41,137 tons while production was only 36,216 tons. The ore market was unchanged on Saturday with the flotation grade quoted at \$25 a ton, and mill at \$26.

Non-Ferrous Averages

The average prices of the major non-ferrous metals for March, based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.*†	8.75c. a lb.
Lake copper, Eastern delivery*	9.12½c. a lb.
Straits tin, Spot, N. Y.	46.87½c. a lb.
Zinc, East St. Louis.	3.89½c. a lb.
Zinc, New York.	4.24½c. a lb.
Lead, St. Louis.	3.43c. a lb.
Lead, New York.	3.58c. a lb.

*Blue Eagle copper. †Price ¼c. higher in Connecticut Valley.

The Week's Prices. Cents Per Pound for Early Delivery

	April 3	April 4	April 5	April 6	April 8	April 9
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake Copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, New York.	48.40	49.37½	49.37½	49.37½	49.50	49.25
Zinc, East St. Louis.	3.90	3.90	3.90	3.90	4.00	4.00
Zinc, New York.	4.25	4.25	4.25	4.25	4.35	4.35
Lead, St. Louis.	3.50	3.50	3.50	3.50	3.50	3.50
Lead, New York.	3.65	3.65	3.65	3.65	3.65	3.65

*Refinery quotations; price ¼c. higher delivered in Connecticut.
Aluminum, virgin 99 per cent plus, 19c. to 22c. a lb., delivered.
Aluminum, remelt No. 12 (alloy), carload lots delivered, 14c. a lb., average for week.
Nickel, electrolytic, 35c. to 36c. a lb. base at refinery in lots of 2 tons or more.
Antimony, 14.50c. a lb., New York.
Brass ingots, 85-5-5-5, 8.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig.	50.50c. to 51.50c.
Tin, bar.	52.50c. to 53.50c.
Copper, Lake.	10.25c. to 11.00c.
Copper, electrolytic.	10.00c. to 10.50c.
Copper, castings.	9.75c. to 10.75c.
*Copper sheets, hot-rolled.	16.00c.
*High brass sheets.	14.25c.
*Seamless brass tubes.	16.00c.
*Seamless copper tubes.	16.25c.
*Brass rods.	12.75c.
Zinc, slabs.	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.	10.25c.
Lead, American pig.	4.50c. to 5.50c.
Lead, bar.	5.50c. to 6.50c.
Lead, sheets.	7.25c.
Antimony, Asiatic.	15.50c. to 16.50c.
Alum., virgin, 99 per cent, plus.	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.	18.00c. to 19.00c.
Solder, ½ and ⅓.	30.00c. to 31.00c.
Babbitt metal, commercial grades.	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig.	53.50c.
Tin, bar.	55.50c.

Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slabs	5.50c. to 5.75c.
Lead, American pig.	4.50c. to 4.75c.
Lead, bar	7.75c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade.	18.50c.
Babbitt metal, high grade.	55.25c.
Solder, ½ and ⅓	31.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	5.75c.	6.50c.
Copper, hvy. and wire	5.62½c.	6.12½c.
Copper, light and bottoms	4.62½c.	5.12½c.
Brass, heavy	3.00c.	3.62½c.
Brass, light	2.25c.	3.00c.
Hvy. machine composition	4.62½c.	5.12½c.
No. 1 yel. brass turnings	4.00c.	4.50c.
No. 1 red brass or compos. turnings	4.25c.	4.75c.
Lead, heavy	2.62½c.	3.00c.
Zinc	2.00c.	2.37½c.
Cast aluminum	10.12½c.	11.25c.
Sheet aluminum	11.50c.	13.00c.

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Blast Furnace Added At Buffalo

BUFFALO, April 9.—Blast furnace operation was increased here with the blowing in of an additional merchant stack at the Hanna Furnace Corp., making two active at this plant. Pig iron sales are not heavy and the tonnage is small.

The Lackawanna plant of the Bethlehem Steel Co. is operating nine open-hearth furnaces and the Seneca sheet division of Bethlehem is operating at 75 to 80 per cent. Republic Steel Corp. is operating three open-hearths, but was down over the week-end. Wickwire-Spencer Corp. is operating one furnace.

Merritt, Chapman & Scott of New York are low bidders on a \$135,000 job at Niagara Falls, involving the purchase of 2210 lineal feet of 54-in. cast iron pipe for an intake pipe. A service station at Niagara Falls will require about 100 tons of fabricated structural steel.

Approximately 1000 tons of No. 1 heavy melting steel was sold during the week at \$10.50 to a consumer who is reported to have also purchased 2500 tons at \$10, though the latter report is unverified. The mill's offering price is now \$9.50. This same producer bid un-

successfully last week for the New York Central and Erie railroad lists, offering \$10.50 for No. 1 heavy melting steel, but the lists went to Lorain, Ohio, from Cleveland. A sale of 2500 tons of short shoveling borings and turnings and cast iron borings was made at \$6.25, and a sale of 200 tons of stove plate at \$9 is reported. The first boatload of scrap came in last week from Detroit.

Lack of Vessels Checks Boston Scrap Exports

BOSTON, April 9.—Scrap exports are still held back by a lack of vessel space. Exporters are buying No. 2 steel at \$7.25 to \$7.50 a ton, delivered local army base, and are making offers of \$8.25 to \$8.50 a ton, mostly \$8.50, for No. 1 steel and scrap rails. The Norwegian freighter Blink last week made port with china clay for Boston and Philadelphia. After unloading she will load scrap at some Atlantic port. No No. 1 or No. 2 steel is moving to Pennsylvania; consequently quotations are nominal. In anticipation of higher railroad freight rates some breakable cast for Pennsylvania consumption is being moved at \$5.10 f.o.b., steel turnings for Weirton are being shipped at \$1.75 with \$1.30 ruling on deliveries else-

where, bundled skeleton is selling at \$4.75 to \$5, mostly \$4.75, and shafting generally at \$12, but tonnages involved are comparatively small.

Freight rate advances have failed to stimulate demand for pig iron. Current business is confined to small scattered lots, and there are no prospective round tonnages in the market. Outside of Connecticut, the New England pig iron weekly melt is still very light.

Warehouses have reduced prices on cold-finished bars \$3 a ton.

Sheet Demand Dips At Cincinnati

CINCINNATI, April 9.—Demand for pig iron is without great fluctuation. Some district users are not anticipating requirements, being content with spot shipments. Average weekly demand hovers between 800 and 1000 tons, all of which is in small lots. Automotive, stove and agricultural implement foundries are operating at a good rate, but jobbing and machine tool foundries are at a low level.

Sheet steel demand, reacting to a change in automotive buying, has dipped to about 65 per cent of capacity. In contrast to the automotive demand, however, business from miscellaneous sources is close to normal proportions. Mill operators report that lack of confidence in Washington policies is again spreading fear among business men. Labor difficulties in a local radio and refrigerator plant have been cleared and production renewed. Rolling schedules of district mills will be at about 70 per cent this week, first quarter contracts being now cleared and backlogs reduced to a negligible amount.

Foundry coke shipments are adhering to a high level as the melt shows little change.

While embargoes on No. 2 steel scrap have been lifted, the movement of this grade is not much better than a trickle. The market is uniformly soft, with virtually no purchasing and only necessary scrap moving on contract. Dealers' bids are unchanged this week, but the market has a weak tone.

The Cooper-Bessemer Corp., Mt. Vernon, Ohio, and the Schippers-Podevyn Societe, Hoboken-Antwerp, Belgium, have recently taken out licenses to manufacture all grades of Meehanite metal.

Steel Inspection Methods and Their Limitations

(CONTINUED FROM PAGE 9)

usually be intolerable, as steel is commonly specified to be within 0.10 per cent carbon and often within 0.05 per cent.

In interpreting the meaning of a chemical analysis, one should remember that the composition is that which existed at the point where the chips were drilled, that the properties of the metal may be greatly affected by metallic inclusions such as oxides, silicates and oxysulphides, and that the metal may be banded or segregated and may have faulty physical structure. Figs. 1 and 2 show segregations which may be present in steel bars. The carbon segregation appearing in Fig. 1 was found in a broken crankshaft. Fig. 2 shows a slag inclusion and phosphide banding in steel broken in the drawing operation.

Spectroscope Used to Test White Iron

Spectroscopic analysis is most useful in determining traces of elements which would be difficult if not impossible to discover by ordinary chemical analyses. It also gives a more complete picture of all metals present. It is used in making certain tests where it is much quicker than chemical analyses and especially where small quantities of some element are either present or absent. The spectroscope recently has been employed to determine silicon and manganese in white iron. These elements can be identified within an accuracy of 0.03 per cent in about 10 min. time and without the necessity of milling chips, which in the case of white iron is difficult. Except for this method it is necessary to estimate from the fracture the silicon content of white iron intended for malleabilizing, because there is not time to determine the silicon while the iron is being melted in the air furnace.

Inspection of bar surface is relatively easy, requiring only a little experience. In doubtful cases pickling will usually accentuate the defect. The requirement for good surface becomes more important if the steel is to be sub-

jected to fatigue. On such material as wire for good coil springs, the surface must be free from hair line seams, die marks and pits or gouges after pickling, even though the wire has been twisted. The pickled wire cannot be used, so that in this case, as well as in many other inspection methods, you throw away what you know is good and hope the rest is as satisfactory.

Fracture examination is useful

in checking heat-treated steel, although in the "as rolled" condition the fracture may show over-heating and burning, as well as piping, flaking or internal cracking. This test is easily carried out and serves as an excellent check for refinement of grain and defects just listed.

The difficulty of tests, such as for tensile strength, torsional strength, and compressive strength,

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is that while they indicate the strength of the steel under static stress in which the load is slowly applied (except the impact test), they do not necessarily indicate behavior when dynamic stresses are involved.

The Erickson cup test is used in testing sheet and strip steel for forming and drawing operations. Its usefulness is disputed by some people, but a number of organizations employ it as standard practice. At one large plant, sheets for forming are specified by limiting the hardness and Erickson cup test and requiring a normalized sheet. The size of grain is judged from the orange peel appearance of the Erickson test. Many metallurgists feel that it is better to specify that the sheet steel shall be capable of being drawn to make the part for which it is intended. With this type of specification, the scrap produced in drawing is simply returned to the steel mill.

Examination for metallographic inclusions may be used to supplement the deep acid etch test. The inclusions may be identified in most cases and their relative harmfulness estimated. Specifications have been drawn in which the number of inclusions per unit of area are limited. Fig. 3 and 4 show the General Motors chart in which this is done. The metallographic structure examination is used when steel is purchased in an annealed, normalized or heat-treated condition. For high carbon steels the structure required is usually spheroidal cementite in order to permit easy machineability. Woody or laminate structure and segregation may also be checked by this means.

In fact, nearly all physical defects can be found this way. The trouble is that only one small section is examined so that it is difficult to know whether the findings are representative.

Grain Size and Abnormality Checked Together

Grain size and abnormality are usually checked together. These two tests, which have come into use during the past 10 years, are useful in indicating relative hardenability and other characteristics, such as machineability. The con-

trol of grain size means closer hardness limits and perhaps more uniformity in distortion during hardening.

The effect of grain size on properties of steel is illustrated in the brittleness of some nickel chromium molybdenum wire for roller bearings. This wire, though within the chemical composition specified for the parts, was too brittle for use. It would fracture in the hardened condition when bent at an angle of about 4 deg. Some previous wire which was satisfactory could be bent nearly 90 deg. before frac-



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ture. The composition and hardness of the two wires were as follows:

	<i>Brittle Wire</i>	<i>Tough Wire</i>
	<i>Per Cent</i>	<i>Per Cent</i>
Carbon	0.55	0.54
Chromium ...	1.02	0.93
Nickel	1.89	1.88
Molybdenum ..	0.21	0.19
Manganese ...	0.60	0.57
Silicon	0.23	0.18
Sulphur	0.014	0.019
Phosphorus ..	0.018	0.018

Both samples were hardened by being heated to 1450 deg. F.,

quenched in oil at 84 deg. and drawn at 600 deg. They had a hardness of 52.5 on the Rockwell C scale. Both samples were carburized and examined for grain size and found to be as shown in Fig. 5. The tough steel was fine grained and the brittle steel coarse grained. The difference in grain size was responsible for difference in behaviour.

Decarburization is accurately measured with the microscope when the steel is annealed or normalized. It can be checked with a file when high carbon steel is in the "as

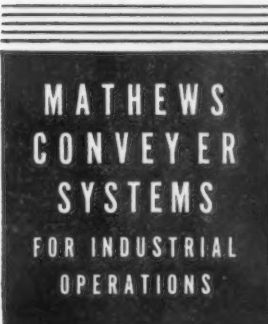
quenched" condition. It is difficult to estimate the depth of decarburization with a file. Decarburization is intolerable when wear is encountered or when the steel is used as a tool. It is also known to reduce fatigue resistance.

The Strauss test indicates the resistance of steel to intercrystalline corrosion. It consists of placing steel in a hot acid copper sulphate solution for a period of time and then examining it for corrosive attack at the grain boundaries. E. C. Bain and his associates worked out an excellent method of observing the progress of the intergranular attack. They measure the electric resistance of the steel and find that this increases as the attack increases. If stainless steel is welded, it is a good plan to subject it to the Strauss test after welding.

Creep Test Limited in Use

Creep tests are usually of such long duration that they are not ordinarily used in inspection testing. They are worth while in selecting steels to be used at elevated temperatures where much stress is encountered.

High amperage tests are used to find small hidden cracks. They have been employed with considerable success in finding fissures in rails. They are most valuable on parts which have a uniform cross-section and metallographic structure. They depend on a potential drop due to the presence of a flaw which will then be greater than if the flaw were absent. Credit for working out this test for inspecting rails is given to E. A. Sperry. b. Magnetic tests are used for similar purposes as high amperage tests. The test is



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usually carried out by making the steel to be tested a core in a primary secondary winding. The amperage developed in the secondary winding opposes the current from similar winding which has a good piece of similar material as a core. This test is affected by strains in the steel and by different metallographic structures as well as by flaws. Consequently where steel varies much in strain or structure, the test is not very useful. One successful application has been in picking out bars of screw stock which happened to contain badly segregated inclusions. In this case screw stock was being machined at an extremely high cutting speed. The machining operation was satisfactory, except that an occasional bar of steel would ruin the cutting tools and make it necessary to stop the machine and replace the tools. The magnetic tester was able to pick out the bad bars and 100 per cent inspection of the steel by this means made the job successful.

Rate of oxidation tests are applied to steels to be used as automotive exhaust valves or power plant soot blower tubes or electric furnace resistance wire. A regular procedure of heating and cooling has been worked out and standardized for the latter. The inspection method normally used is to measure the loss of weight after the heating and cooling cycle.

The inspection for ordinary hot-rolled forging bars usually consists in taking samples for chemical analysis from six bars in each carload of steel received. A carload is usually one-third to one-half of a heat of steel. The surface of the bars is given a rather casual inspection—these bars are usually rusty or scaly—and the sheared fracture examined. If any

indication of piping or segregation is observed, pieces are cut off for hot acid etch and the presence of the defects established. If seams are noticed, the steel is pickled and carefully inspected. In some cases it is customary to require the steel mill to label the bars from the top of the ingot in order to find the bars that are most apt to be piped or segregated.

All six samples which are cut for chemical analysis are checked for carbon content. Every other sample, or three out of the six, is given a complete analysis. Of the other elements, sulphur and phosphorus seldom exceed the specification so that sometimes these elements are tested on only one of the samples. Phosphorus is usually so low that it can be estimated after precipitation as molybdate. It is possible to specify and obtain a carbon range of 0.05 per cent, although 0.01-0.02 per cent carbon over and under the specification is usually allowed and the manganese content is often considered in case of possible rejection.

Examination of bars for ring gears at one of the large automobile plants consists in the inspection listed above for hot-rolled bars and, in addition, the following procedure:

Deep acid etch the six bar ends cut for chemical analysis. If one bar with bad segregation or pipe is found, the heat is rejected. Make metallographic examination of three out of six bars for inclusions and compare with company's inclusion chart of acceptable structures. Carburize one sample of the six bars and make a metallographic examination for abnormality and grain size. The specified range for grain size is from No. 5 to No. 8. Forge 150 gear blanks

and follow them through all operations to the finished gear. Note especially machineability, hardenability and distortion on heat treatment.

Bars for flat leaf chassis springs at one automobile plant are inspected by the same method used for hot-rolled bars, and, in addition, the following:

From two bars in a carload of steel cut sections about 10 in. long. Cut a piece from one of these sections for metallographic inspection and examine for inclusions, banding and segregation. The remainder of the piece is normalized and again similarly examined, both on the cross-section and longitudinal section. For silico-manganese steel, from which a large majority of chassis spring leaves are made, the normalizing is done at about 1780 deg. F. Incidentally, for silico-manganese steel the desired carbon range is about 0.56 to 0.61 per cent. Below 0.56 per cent carbon there is a tendency for the steel to be woody; above 0.61 per cent the steel is a little too hard with standard treatment. Usually from 0.53 to 0.63 per cent is accepted.

The other of the two steel sections passes through the production heat-treating furnace, is quenched in oil, examined for hardness, put through the drawing furnace and again examined for hardness. From the hardness so obtained the treatment for the particular heat of steel is worked out.

To test wire for coil springs, samples from five or six bundles of each heat of steel, representing about 10 per cent of the bundles in a heat, are chemically analyzed. Six feet of wire is then cut off each bundle. From this wire three

test pieces are cut for the twist test. These pieces are held in grips 10 in. apart and are twisted forward seven turns of 360 deg. and then reversed for the number of reversals corresponding to the size of wire. For 13-gage wire having a diameter of 0.0925 in., the wire shall make 26 reverse twists of 360 deg. before failure; for 7-gage wire having a diameter of 0.177 in., the wire shall make 14 reverse twists before failure.

The remaining wire from the 6-ft. piece is given a deep acid etch test for examination of the surface and fracture. The surface must be free from seams, hair lines, pits, gouges, die marks or other imperfections. A tensile test is made from each bundle. Wire having a diameter of 0.128 in. must have a tensile strength of 200,000 lb. per sq. in. and a minimum reduction of area of 48 per cent. Before being drawn into wire at the mill, rods are inspected for decarburization, which must be not more than 0.008 in., including partial decarburization. From 1 to 5 per cent of the springs from each coil are etched and the surface and ends examined.

At the plant where the above inspection is carried out, about 10 per cent of the bundles are rejected on the twist test and an additional 2 per cent as the result of the deep acid etch test. Rarely are any bundles rejected because of wrong analysis on ordinary spring steel. In the case of stainless steel wire, rejection due to wrong analysis is more common.

At a large ball bearing plant the inspection of low carbon sheet steel suitable for carburizing calls for the following procedure:

1. The steel must withstand the draws to which it is subjected in forming. If more than 3 per cent of the steel breaks in blanking, forming, coining or punching, it shall be cause for rejection.
2. Carburize and make a grain size test. No. 6 to 8 is acceptable. The structure must be normal.
3. Harden a carburized sample by quenching at 1430 deg. F. into water. The hardness must be Rockwell C 60 minimum.
4. Examine the microstructure for inclusions and compare with inclusion chart.
5. Make a tensile test from one sheet out of the shipment. The steel shall have a minimum per



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cent elongation in four inches of 36.5 per cent and tensile strength of 47,500 lb. per sq. in.

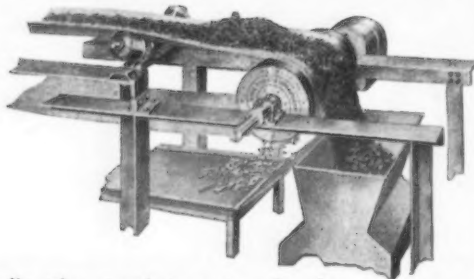
6. Make chemical analysis of one sheet out of the shipment.

In testing bars for ball bearing balls the same plant etches 10 per cent of all stock to check seams and surface defects and examines the ends for pipes. Ten bars from each shipment are examined for decarburization. For bars or coils 0.245 in. in diameter or under, de-

carburization shall be no more than 0.003 in. and for bars 1.500 in. in diameter or greater it shall be no more than 0.008 in. Ten bars from each shipment also are tested for hardness and shall Brinell between 175 and 210.

If the results of the various tests show that the steel barely passes specifications, a greater percentage of bars is inspected. Often other inspection methods are applied when acceptance is in question.

IRON PROBLEMS SOLVED



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Reconditioning Pickling Solutions

(CONTINUED FROM PAGE 11)

rous-sulphate to ferric-sulphate or in producing sulphuric acid from a mixture of equal volumes of sulphur-dioxide and sulphur-trioxide, and no acid manufacturing process based on these reactions has proven economically practical. Consequently, chemists have attempted to roast ferrous-sulphate in the presence of a reducing agent, in order that only sulphur-dioxide would be liberated.

Vanadium Catalyst Simplifies Process

Two processes for sulphuric acid production from sulphur-dioxide gas are now in common use. The older utilizes nitrogen-oxides to oxidize the dioxide into trioxide in large lead chambers, after which the most trioxide is condensed to form the sulphuric acid. This process, however, calls for high initial temperatures of the sulphur dioxide. The later or contact process effects oxidation in the presence of a catalyst, and permits the trioxide to be absorbed in strong sulphuric acid. Platinum was at first the only dependable catalyst, but unless the sulphur-

dioxide gas was of high purity the platinum became poisoned or damaged. As a result, contact acid production plants employing platinum catalyst were intricate, costly and hard to operate. The introduction in 1927 of a non-poisonous vanadium catalyst greatly improved and simplified the contact process and reduced its costs.

An early effort at manufacturing acid from ferrous-sulphate was the development ten years ago by Chemical Construction Corp. of a roasting and reducing process to yield gas that could be utilized in a chamber acid production plant. Spent pickling liquors of that period contained relatively little free acid and the neutralization was not then regarded seriously. Yet the kind of equipment required and the high cost of chamber acid plants were a handicap in all but very large-scale production, and no actual commercial installations were made.

Shortly thereafter, the late I. Hechenbleikner, then vice-president and chief engineer of Chemical Construction Corp., developed the chemico sludge conversion process,

in which decomposition of refinery acid sludge into sulphur-dioxide was effected in a rotary kiln. This sludge, which is a mixture of sulphuric acid and hydrocarbons was so successfully handled that the rotary kiln suggested itself to Mr. Hechenbleikner and his associates as a practical commercial means for reducing metallic sulphates. A small test plant readily proved its ability to reduce solid ferrous-sulphate to iron-oxide and to sulphur-dioxide which was entirely suitable for use in the contact process of acid manufacture.

The earlier experimentation proved that an almost anhydrous ferrous-sulphate was necessary for satisfactory reduction. The product obtainable by direct crystallization from pickle liquor contains seven molecules of water of crystallization and the dehydration of this heptahydrate or copperas had long been considered difficult. The satisfactory decomposition of solid sulphate by the rotary roaster led to consideration of the latter for dehydrating the copperas with simultaneous neutralization of the free acid. By neutralizing the free acid with some of the iron-oxide produced in later reduction of the dehydrated sulphate, neutralization and dehydration of the liquor in a single rotary roaster, internally heated by combustion gases, was proven to be a safe and practical procedure. Although spent pickling liquor will not ordinarily react with iron-oxide cinders, a reaction causing complete neutralization of the free acid was found to be assured under the controlled temperature and concentration conditions within a special type of rotary dehydrator.

New Procedure Is Successful

On the basis of these demonstrations, the Chemical Construction Corp. in 1932 commenced to offer plants for making sulphuric acid from waste iron - sulphate solutions by a process employing the following steps:

(1) Neutralization and evaporation of the sulphate solution in a rotary dehydrator, using iron-oxide for neutralization of the free acid, and producing an almost anhydrous iron-sulphate.

(2) Decomposition of the anhydrous iron-sulphate in a rotary roaster, producing (a) sulphur-dioxide gas of proper concentration for subsequent use in a contact

acid production plant, and (b) iron-oxide cinder, of which part could be utilized for neutralization of additional sulphate solution.

(3) Conversion of the sulphur-dioxide into sulphuric acid of any desired strength, in a modified form of the standard chemico contact acid production plant using a vanadium catalyst.

The reduced business activity during 1932 and subsequent years has retarded commercial installation of the process in the steel industries, but it has been successfully applied in another industry which has been operating at high capacity and producing waste iron-sulphate solutions in large quantities.

The industry in question is the manufacture of titanium-dioxide for use as a paint pigment. Production in this instance involves sulphuric acid treatment of ores containing iron and titanium, and forms a waste liquor containing 18 to 25 per cent of free H_2SO_4 , 10 to 16 per cent of $FeSO_4$, and traces of titanium sulphate. Although these relative quantities of free acid and iron-sulphate differ somewhat from the ratio commonly found in spent liquor from steel pickling tanks, reclamation from the waste titanium liquor proved quite similar and susceptible to the same general procedure.

Conclusive experimental demonstration and definite guarantees as to equipment performance led the Titanium Pigment Co., Inc., to authorize the construction of the first large commercial ferrous-sulphate conversion plant at St. Louis, Mo.

This plant, from which the accompanying illustrations were made, was completed in 1934. In November and December of that year it was given final tests at outputs in excess of guaranteed capacity, while operating *first* on sulphate liquor alone, *second* entirely on pyrites, and *finally*, on a combination of both sulphate liquor and pyrites. All capacity and efficiency guarantees having been fully met, the plant was promptly accepted, and the owner immediately authorized the design and construction of a second and larger sulphate conversion plant at its new pigment factory which is being built at Sayreville, N. J. This second conversion plant is to be ready for operation before the summer of 1935.

The St. Louis plant houses most of its equipment in two large steel-framed buildings. One contains the dehydrator kiln, two rotary roasters and accessories, and space for duplication of equipment in case of plant enlargement. The other contains the main acid production equipment, including catalytic converters, heat exchangers, centrifugal exhausters, and a central control room. Gas-washing towers, acid absorption towers, coolers, and other equipment which is impervious to climatic influences are located outside, and close enough to the buildings and to each other for connection by flues and piping of minimum length. Overhead traveling cranes within the buildings provide for handling the heavy equipment parts.

Production Is Semi-Automatic

Obviously the important economic advantages of the process to the steel pickler are the elimination of disposal problems, and the economical conversion of the waste liquor into strong sulphuric acid for further pickling operations. The conversion is accomplished efficiently without escape of fumes, without waste and at substantial money saving over other forms of disposal.

The dehydrated sulphate is converted by much the same contact method as is used in sulphuric acid production from pyrites ore except that a heating and reducing agent is required. Cheap pulverized coal is excellent for this purpose, but pyrites can be mixed with the dehydrated sulphate for the double purpose of producing additional sulphur-dioxide and utilizing the heating value of the pyrites to cut down on the coal requirements. The additional sulphur-dioxide produces the "make-up" acid, to replace that which is lost in the recovery cycle.

When roasting the dehydrated sulphate, the raw material cost is only that of pulverized fuel plus that of collecting and evaporating the waste pickle liquor. Due to absence of market for ferrous-sulphate in large quantities, the liquor itself has no value. The cost of evaporating the liquor depends upon its degree of dilution and the availability of cheap fuel, two factors which differ for each installation. Obviously, however the more concentrated the liquor, the less the cost of converting it before de-

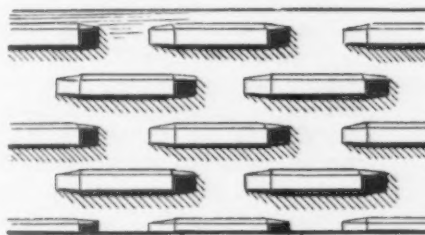


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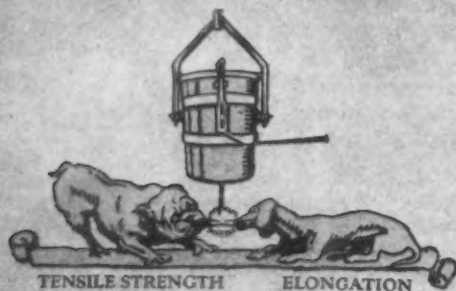
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CARNEGIE
STEEL COMPANY
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United States Steel Corporation Subsidiary

STRONG STEEL CASTINGS



Strong Steel Foundry Co.

Buffalo, New York

livery to the dehydrator, and the lower the acid production costs.

The excess iron-oxide formed as the by-product in the rotary roaster can be sintered cheaply to produce ore which may either be thrown back into the blast furnace for utilization of its metallic and oxygen contents, or may be marketed as a red pigment. Either procedure reduces the net cost of acid production, and spent pickling liquors of normal concentration can be used to produce sulphuric acid more cheaply than can any other raw material available to the steel mill.

Acid production being necessarily continuous and largely semi-automatic with mechanically handled materials, large plants are cheaper than small ones and are cheaper to operate per unit of capacity. However, the process may also be profitably utilized to solve the disposal problems of a group of small producers of spent pickling liquors, by dehydrating the sulphate in small scattered plants, and roasting the sulphate in a single centrally located and larger acid plant.

The chemico process of ferrous-sulphate conversion employs numerous basic features already covered by United States and foreign patents, and other features on

which patents are pending. The patents for all essential equipment features belong to the Chemical Construction Corp. of New York, or are under its control through affiliated companies.

Electric Aids to Precision Rolling of Steel Parts

(CONCLUDED FROM PAGE 15)

tric pyrometer is its speed of operation. The response of the tube and amplifying circuit to a change in temperature is instantaneous, the only delay in indication or record being the time required for the instrument to assume its new position, and this can be made one second or less. It does not have to be manipulated for each reading, as does the optical pyrometer.

The pyrometer can also be used as a temperature control by adding one or more Thyatron tubes. The tube may be adjusted so that it will become conducting whenever the temperature, and consequently the phototube current, reaches a predetermined value. The current passing through the Thyatron

tube may then actuate the desired controlling mechanism.

There are many applications in the steel mill for the photoelectric pyrometer. It is not inherently an extremely portable equipment, and can be used to best advantage as a permanent installation; for example, indicating and recording the temperature of tubes passing through a seamless or lap-weld mill, or of rails, sheet bar, or similar material. If equipped with two Thyatron relays, it can be arranged to prevent a piece of metal from entering a mill unless its temperature lies between predetermined limits.

Anything seemingly so fragile as a glass bulb filled with "emptiness" may look out of place in a steel mill. Nevertheless, these little glass bulbs are rendering good service in many mills, as indicated in the foregoing paragraphs, and their use is rapidly increasing.

Readers interested in going further into the subject may find the following bibliography useful:

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"Electron Tubes in Industry"—W. R. King, A.I.E.E. TRANSACTIONS, June, 1931.

"The Photoelectric Recorder"—C. W. LaPierre, A.I.E.E. TRANSACTIONS, 1932, Vol. 51, No. 1, page 226.

"Thyatron Used to Maintain Proper Tension in Wire Reeling"—T. R. Rhea, THE IRON AGE, Dec. 4, 1930.

The Mackintosh Hemphill Co., Pittsburgh, has prepared a booklet, recording the company's achievements from 1803 until 1935. A chronology of important industrial developments, with which the company was closely identified is included. In 1803 the Pittsburgh Foundry was founded by Joseph McClurg, later becoming the A. Garrison Foundry Co., represented as the first foundry in Pittsburgh. After various mergers and ownership changes, the name was changed to Mackintosh-Hemphill & Co. in 1893. Among early historical events in which the original organization played a part was the building of cannon for Perry's fleet in 1812.

Reinforcing Steel

Awards 1800 Tons—New Projects
2980 Tons

AWARDS

Calumet City, Ill., 100 tons, Thornton Township high school, to Inland Steel Co.

Minneapolis, 450 tons, State armory, to Kalman Steel Corp.

Roby, Ind., 100 tons, plant addition for American Maize Products Co., to Calumet Steel Co.

Chicago, 890 tons, Olson Rug Co., to Joseph T. Ryerson & Son.

State of Illinois, 250 tons, bridge, to Joseph T. Ryerson & Son.

NEW REINFORCING BAR PROJECTS

New York, 400 tons, wholesale market house in Bronx.

New Brunswick, N. J., 150 tons, hospital addition.

Washington, 400 tons, sewage treatment plant No. 2; bids due April 22.

Zanesville, Ohio, 100 tons for Mohicanville Dam, in connection with Muskingum District Conservation project; bids to be taken by United States Engineer, April 30.

Zanesville, 587 tons, for Dover Dam, in connection with Muskingum District Conservation project; bids to be taken by United States Engineer, May 3.

Peoria, Ill., 300 tons, for Hiram Walker, Inc.

Chicago, 675 tons, Stickney pump house for Sanitary District; M. J. Boyle & Co., Chicago, low bidders on general contract.

Fort Peck, Mont., 11,000 tons for spillway; Addison-Miller, Inc., and Fielding & Shepley, Inc., Minneapolis, low bidder on general contract.

St. Charles, Mo., 158 tons, approach substructure for Wabash Railway bridge across Missouri River; bids due April 24.

San Francisco, 203 tons piers 44 and 46, bulkheads; bids open.

Oakland, Cal., 680 tons, wharf extension, April 15.

Cast Iron Pipe

Metropolitan District Commission, Boston, will receive bids until April 18 on 1390 tons of 20 in. cement lined bell and spigot pipe, 40 tons of bell and spigot, and 12 tons of flanged castings.

Niagara Falls, N. Y., will buy 2210 line. ft. of 54-in. for intake pipe; Merritt, Chapman & Scott, New York, are low bidders.

Washington Suburban Sanitary Commission, Hyattsville, Md., plans water pipe lines in Montgomery and Prince George Counties; also number of sewer mains. Fund of \$250,000 is being arranged for entire project.

Colfax, Wash., closes bids April 15 for 6259 ft. of 4 and 6-in. for water supply in Southwestern part of city. W. M. Bloom is city engineer.

Wellington, Kan., has engaged Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineers, to prepare plans for new waterworks station at Wellington Lake, including 16,000 ft. 16-in. for main supply to city; also 1,000,000-gal. filtration plant, pumping station, etc. Cost about \$105,000.

Burnet, Tex., plans pipe lines for water system; also elevated steel tank and tower, pumping station and service facilities. Cost \$46,000. Revised plans being drawn by J. W. Beretta Engineers, Inc., National Bank of Commerce Building, San Antonio, Tex.

SPONGE IRON and POWDER IRON for Metallurgical and Chemical Use

Steels made with SWEDISH SPONGE IRON as a raw material show a VIBRATION DAMPING CAPACITY TWICE that of similar steels made with scrap as a raw material. References: Report of investigations, Bureau of Mines, R. I. 3229, page 63,—Obtainable from us or directly from B. M.

Tool Steels and Structural Members in fast moving machines often fall on account of vibrations which cannot be eliminated by design. Try a Sponge Iron Steel.

EKSTRAND & THOLAND, INC.
122 E. 42nd ST., NEW YORK CITY
DETROIT-CHICAGO

Interior, S. D., asks bids until April 22 for about 7900 ft. of 4-in. for water supply; also for pumping equipment and other waterworks construction. Dakota Engineering Co., Mitchell, S. D., is consultant engineer.

Fox Point, Wis. (Milwaukee P. O.), will take bids at once for 12,250 ft. of 16-in. for main water line from village limits

to connection with trunk main at Milwaukee.

North East, Md., plans pipe lines for water supply; also other waterworks equipment and extensions in sewage system. Fund of \$150,000 is being arranged for entire project.

Perry, Mo., will soon take bids for water pipe lines; also for elevated steel tank, pumping machinery and other waterworks equipment. Fund of \$51,000 has been approved. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Frostburg, Md., plans pipe line from Eckhart to Mount Savage for water supply.

Niles, Cal., plans about 2000 ft. of 24-in. for water supply from reservoir near city to connection with main trunk line in Niles-Centerville highway.

Aurora, Ill., will soon take bids for water pipe lines. Fund of \$110,000 has been arranged for this and other waterworks equipment. Walter E. Deuchler is city engineer.

Chicago will buy about 1000 tons for Sanitary District, mainly pipe fittings, through contractor. Herlihy Mid-Continent Co., Chicago, is low bidder on general contract.

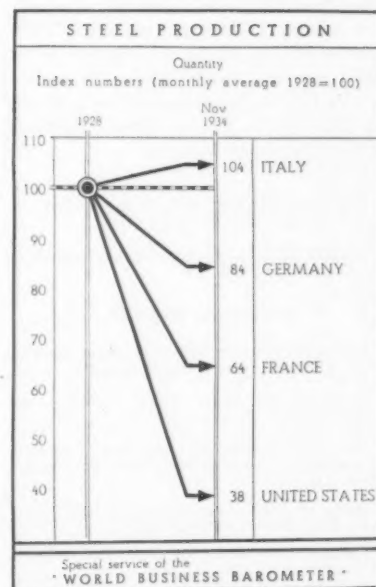
Racine, Wis., closes bids April 22 on \$125,000 filtration plant addition, filter equipment, pipe, wash water pumps and mixing devices. Alvord, Burdick & Howson, Chicago, are consulting engineers.

Marion, Wis., has placed 22,700 ft. of 6 and 8-in. with James B. Clow & Sons.

Madson, Wis., has placed 1900 ft. of 20-in. with James B. Clow & Sons.

Campbellsport, Wis., has low bid from American Cast Iron Pipe Co. on 200 tons of 6 and 8-in. class C.

New Orleans has awarded 1100 tons to National Cast Iron Pipe Co. and 3000 tons to United States Pipe & Foundry Co. It is also understood that United States Pipe & Foundry Co. will secure orders for about 2000 tons for work to be done at Nashville, Tenn.



A COMPARISON of the extent of recovery in the steel industries of the United States and three important Continental European countries is shown in this chart. Taking 1928 as 100, it is interesting to see that the Italian industry has shown the greatest relative recovery. The United States, of course, is far behind its Continental competitors as well as Great Britain.

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Hemp Center
Wire Rope Center
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Seale - Filler Wire
Warrington

Fabricated Structural Steel

Awards Higher—New Projects in Large Volume

WITH lettings mostly in small tonnages, awards total 10,600 tons compared with 8300 tons last week. Transmission towers in Tennessee for the Tennessee Valley Authority, calling for 3770 tons, and an aircraft factory in San Diego for the Consolidated Aircraft Corp., requiring 1325 tons, are the largest bookings. New projects of 40,868 tons compare with 9300 tons in the previous week and 2600 tons two weeks ago. The outstanding new jobs are 25,000 tons for the Triborough bridge in New York and between 7000 and 8000 tons for a post office in St. Louis. Plate awards total 2850 tons. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Northampton, Mass., 390 tons, dormitory building, Smith College, to Lehigh Structural Steel Co.

Taunton, Mass., 380 tons, hospital and infirmary, to Haarman Steel Co.

Olcott, N. Y., 220 tons, State highway bridge, to R. S. McManus Structural Steel Co.

Coney Island, N. Y., 210 tons, sewage treatment plant, to McClintic-Marshall Corp.

Schroon Lake, N. Y., 190 tons, school building, to Smith & McCaffrey Co.

Pittsburgh, 350 tons, Stephen Foster Memorial building, University of Pittsburgh, to McClintic-Marshall Corp.

SOUTH AND SOUTHWEST

Charleston and Alloy, W. Va., 200 tons, plant additions for United Carbide & Carbon Corp., to Virginia Bridge & Iron Co.

State of Tennessee, 3770 tons, Tennessee Valley Authority transmission towers; 2520 tons, to American Bridge Co., 1250 tons, to Nashville Bridge Co.

Milton, Fla., 150 tons, State highway bridge, to McClintic-Marshall Corp.

Washington Parish, La., 660 tons, highway bridge, to Jones & Laughlin Steel Corp.

Lee County, Tex., 110 tons, bridge, to North Texas Iron & Steel Co.

Alfalfa County, Okla., 400 tons, bridge, to Patterson Steel Co.

CENTRAL STATES

Detroit, 350 tons, Dodge Brothers Corp. factory building, to R. C. Mahon Co.

Chicago, 215 tons, school building, to Hansell-Elcock Foundry Co.

St. Clair County, Ill., 185 tons, highway bridge at Bellville, to St. Louis Structural Steel Co.

State of Wisconsin, 200 tons, bridge, to Fort Pitt Bridge Works Co.

Calumet City, Ind., 350 tons, high school, to Duffin Iron Works.

Chase, Kan., 175 tons, derrick, to Tulsa Boiler & Machine Co.

Omaha, Neb., 220 tons, Firestone Service building, to Omaha Steel Works.

State of Missouri, 175 tons, bridge, to Stupp Brothers Bridge Iron Co.

San Diego, Cal., 1325 tons, building for Consolidated Aircraft Corp., to Consolidated Steel Corp.

San Francisco, 155 tons, car ferry apron, to Ingalls Iron Works Co.

Berkeley, Cal., 180 tons, American Forge Co. building, to Moore Dry Dock Co.

NEW STRUCTURAL STEEL PROJECTS NORTH ATLANTIC STATES

New York, 15,000 tons, lift span for Triborough bridge; bids to be taken this month.

New York, 10,000 tons, span for Triborough bridge; bids to be taken in May.

Niagara Falls, N. Y., 100 tons, service station.

Westchester County, Pa., 200 tons, home for Friends Society; bids due April 17.

Washington, 200 tons, unit No. 2, sewage disposal plant.

THE SOUTH

Lynchburg, Va., 350 tons, digester house shop extension for Mead Corp.

Sheffield, Ala., 1700 tons, Wheeler dam road approach, Tennessee Valley Authority.

New Orleans, 150 tons, bridge.

Houston, Tex., 250 tons, International Harvester Co. building.

CENTRAL STATES

Austin, Ind., 200 tons, factory.

Elwood, Ind., 350 tons, building for Continental Can Co.

Cleveland, 100 tons, building for Hawthornden Farm, Cleveland State Hospital; bids April 24.

State of Illinois, 1125 tons, bridges.

Peoria, Ill., 650 tons, warehouse.

Madison County, Ill., 400 tons, highway bridge; bids April 19.

Milwaukee Road, 250 tons, bridge repairs.

Waterloo, Iowa, 200 tons, factory.

State of Minnesota, 800 tons, bridges.

St. Paul, Minn., 700 tons, improvements on University Avenue.

St. Louis, 7000 to 8000 tons, superstructure for post office; bids due May 11. Klipstein & Rathman, architects. W. J. Knight & Co., engineers, St. Louis.

WESTERN STATES

Fort Peck, Mont., 4317 tons, spillway gate structure, cut-off structure and appurtenant works; Addison-Miller, Inc., and Fielding & Shepley, Inc., Minneapolis, low bidder on general contract.

State of California, 440 tons, highway bridges at Rock Creek and Storrie.

Boulder City, Nev., 100 tons, transfer car, bids April 14.

Juntura, Ore., 150 tons, gates and hoists; bids open.

Tenino, Wash., 118 tons, State undercrossing; bids open.

FABRICATED PLATE AWARDS

New York, 1325 tons, water mains in Bronx, to Alco Products Co.

Queens, New York, 1360 tons, water pipe in Thirty-fifth Avenue, to Alco Products Co.

Marion, Wis., 150 tons, elevated tower, to Pittsburgh-Des Moines Steel Co.

NEW PROJECTS

Princeton, Wis., 150 tons, elevated tower; bids April 18.

Campbellsport, Wis., 150 tons, elevated tower; Chicago Bridge & Iron Works, low bidder.

Juntura, Ore., 100 tons, Agency Valley dam outlet pipe; bids open.

Ignacio, Colo., 100 tons, Pine River siphon, bids April 12.

Oakland, Cal., 300 tons, pipe for East Bay Municipal Utility District; bids April 18.

SHEET PILING NEW PROJECTS

Port Washington, Wis., 100 tons, piling for docks; Great Lakes Dredge & Dock Co., general contractor.

Boston, 7000 tons, army base; bids to be taken soon.

But the Kohler Strike Goes On?*

UNION labor called a strike at the Kohler plant in the village of Kohler on July 16 of last year. It seemed an ill-advised thing to do in the light of all that Walter Kohler had done in trying to maintain employment in a depressed period, but labor was within its rights if it felt that it had grievances that could not be adjusted except through striking.

Eventually a vote to select the proper representatives for the workers was arranged between labor and management, with the help of governmental agencies. In that election, A. F. of L. labor lost and the company union candidates won.

Organized labor then appealed to the National Labor Relations Board, which it had a right to do if it felt that some of those who voted should not have been permitted to cast ballots. As to the more basic question of whether the company union candidates should have been on the ballot at all, labor should have remembered that it had agreed to an election in which it knew the company union candidates would oppose its own candidates.

Be all that as it may, the labor relations board now rules against organized A. F. of L. labor, holding the election valid and pointing out that if all employees who might have been challenged had been ruled out, the company union candidates would still have won.

Certainly this ought to settle the matter so far as the Kohler plant is concerned. Yet we read from the statement of the union labor attorney that the strike will continue and that picketing will be kept up—eight months after the strike was called and six months after an election was held!

This, it would seem to us, is wholly the wrong course. When either labor or management submits to a vote, it should abide by the results of that vote until conditions change and a new election is considered warranted. When labor accepts the offices of government in arranging for the vote, it certainly should accept the final decision of governmental agencies on the fairness and results of the vote, as labor expects management to do. Union labor will not maintain popular support in any other

*An editorial in the Milwaukee Journal, April 2, 1935.

ALCUMITE Pickling Baskets



16 PICKLING BASKETS of an order for 50, for a prominent Detroit manufacturer. Weight, about 45 lbs. each, 14" x 14" x 10" deep.

What's ALCUMITE?

ALCUMITE is a copper base aluminum-iron alloy resistant to a large number of corrosive chemicals and solutions.

It is especially recommended for sulphuric acid under non-oxidizing conditions: for concentrations as high as 80% up to 200° F. and as high as 60% up to 250° F.

It is available in cast and hot rolled forms, and can be machined with the same equipment used for steel.

Bulletin No. 701 gives the chemical characteristics, physical properties, notes on design, heat treating, machining, forging and suggested applications. It will be sent upon request. Just write

THE DURIRON COMPANY, Inc.

438 N. Findlay St.

Dayton, Ohio.

way. For if there is one thing with which the American public has little patience, it is what it considers a "poor loser."

Rail Rate Advances Effective April 18

THE railroad emergency charges recently granted by the Interstate Commerce Commission likely will become effective April 18. The carriers are preparing a master tariff to be filed with the commission. The emergency charges on pig iron, steel and scrap will amount to 7 per cent with a specified maximum of 2c. per 100 lb. On coal and coke they will be 3c. to

15c. per net ton, and on iron ore, 10c. per net ton.

Emergency charges on other raw materials used by the steel industry include 2c. per 100 lb. on fluor-spar, roasted dolomite and crude magnesite. There also will be an emergency charge of 1c. per 100 lb. on fluxing stone and dolomite, not roasted, where present line haul rates exceed \$1 per net ton.

The National Industrial Advertisers Association will hold its annual conference and convention at the Hotel William Penn, Pittsburgh, on Sept. 16, according to announcement by D. C. Grove, advertising manager, Blaw-Knox Co., and president of the local chapter of the association.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.09c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Rail Steel	
(For merchant trade)	
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing	
(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing	
(Straight lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron	
F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*	
Base per Lb.	
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts	
Angle Line Posts	Base per Net Ton
F.o.b. Pittsburgh	\$50.00
F.o.b. Chicago	\$50.00
F.o.b. Duluth	\$51.00
F.o.b. Cleveland	\$50.00
F.o.b. Birmingham	\$53.00
F.o.b. Houston, Orange, Beaumont, Galveston	\$59.00
F.o.b. Mobile	\$58.00
F.o.b. New Orleans	\$59.00
Corpus Christi	\$59.00
F.o.b. cars dock Pacific ports	\$63.00

Plates	
Base per Lb.	
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.95c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates	
F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes	
Base per Lb.	
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.05c.
Del'd New York	2.05c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

Base per Lb.	
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE

TERNE PLATE	
Sheets	
Hot Rolled	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed	
No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled	
No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled	
No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets	
No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Terns	
No. 24, unassorted 8-lb. coating	3.40c.
F.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitrous Enameling Stock	
No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast	3.35c.

Tin Plate	
Per Base Box	
Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate	
(F.o.b. Pittsburgh)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.	
Base per Lb.	
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips	
Base per Lb.	
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock	
No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips	
Base per Lb.	
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	Per Lb.
Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland, Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To Jobbing Trade
Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg	
Standard wire nails	\$2.60
Smooth coated nails	2.80
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

Base per 100 Lb.	
Annealed fence wire	\$2.45
Galvanized fence wire	2.80
Polished staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh, while Pacific Coast prices are \$8 over Pittsburgh. Reception: on fence wire Pacific Coast prices are \$11 a ton above Pittsburgh. On staples and barbed wire, prices \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded	
Off List	
F.o.b. Pittsburgh	35 and 2 1/2 off
F.o.b. Chicago	35 off

STEEL AND WROUGHT PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel	
Inches	Black Galv.
1/2	1.13 29 1/2
3/4	1.13 35
1	1.13 47
1 1/4	1.13 55
1 1/2	1.13 58
2	1.13 64

Wrought Iron	
Inches	Black Galv.
1/2	1.13 138
3/4	1.13 145
1	1.13 151
1 1/4	1.13 158
1 1/2	1.13 164
2	1.13 171

Lap Weld	
2	1.13 60 51
2 1/2	1.13 63 54
3	1.13 65 56
3 1/2	1.13 68 54
4	1.13 70 54
5	1.13 73 54
6	1.13 76 54
8	1.13 82 54
10	1.13 88 54
12	1.13 94 54

Butt Weld, extra strong, plain ends	
1/2	1.13 48 33 1/2
3/4	1.13 51 38
1	1.13 54 41
1 1/4	1.13 57 44
1 1/2	1.13 60 47
2	1.13 66 51

Lap Weld, extra strong, plain ends	
2	1.13 58 50
2 1/2	1.13 62 54
3	1.13 65 57 1/2
3 1/2	1.13 68 54 1/2
4	1.13 70 54 1/2
5	1.13 73 54 1/2
6	1.13 76 54 1/2
8	1.13 82 54 1/2
10	1.13 88 54 1/2
12	1.13 94 54 1/2

On standard steel pipe an extra 5% off is allowed on sales to consumers while 2 1/2% off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the bill-

ing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes	
(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)	
Cold	Hot
Drawn	Roll
1 in. o.d. 13 B.W.G.	\$ 8.60
1 1/4 in. o.d. 13 B.W.G.	10.19
1 1/2 in. o.d. 13 B.W.G.	11.28
1 3/4 in. o.d. 13 B.W.G.	12.81
2 in. o.d. 13 B.W.G.	14.35
2 1/4 in. o.d. 13 B.W.G.	16.00
2 1/2 in. o.d. 13 B.W.G.	19.29
2 3/4 in. o.d. 13 B.W.G.	20.45
3 in. o.d. 13 B.W.G.	21.45
4 1/4 in. o.d. 10 B.W.G.	41.08
4 1/2 in. o.d. 11 B.W.G.	27.09
4 in. o.d. 10 B.W.G.	33.60
4 1/2 in. o.d. 10 B.W.G.	41.08
5 in. o.d. 9 B.W.G.	51.56
6 in. o.d. 7 B.W.G.	79.15

Extras for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5%
10,000 lb. or ft. to 24,999 lb. or ft. 12 1/2%
2,000 lb. or ft. to 9,999 lb. or ft. 25%
Under 2,000 lb. or ft. 40%

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)	
1 1/2 in. o.d. 13 B.W.G.	\$ 9.71
1 3/4 in. o.d. 13 B.W.G.	11.14
2 in. o.d. 13 B.W.G.	12.81
2 1/4 in. o.d. 13 B.W.G.	14.71
2 1/2 in. o.d. 13 B.W.G.	16.58
2 3/4 in. o.d. 13 B.W.G.	17.58
3 in. o.d. 13 B.W.G.	18.58
3 1/4 in. o.d. 11 B.W.G.	21.58
3 1/2 in. o.d. 10 B.W.G.	22.11
4 in. o.d. 10 B.W.G.	23.60
4 1/2 in. o.d. 10 B.W.G.	25.11
5 in. o.d. 9 B.W.G.	26.60
6 in. o.d. 7 B.W.G.	28.11

CHARCOAL IRON BOILER TUBES

Base Discounts, f.o.b. Pittsburgh	
In. O. D.	
1 1/2 and 1 3/4	44
1 3/4	13 and 10
2	16 and 10
3	17 and 10
3 1/2	18 and 10
4	19 and 10
4 1/2	20 and 10
5	21 and 10
6	22 and 10
7	23 and 10
8	24 and 10
9	25 and 10
10	26 and 10
11	27 and 10
12	28 and 10
13	29 and 10
14	30 and 10
15	31 and 10
16	32 and 10
17	33 and 10
18	34 and 10
19	35 and 10
20	36 and 10
21	37 and 10
22	38 and 10
23	39 and 10
24	40 and 10
25	41 and 10
26	42 and 10
27	43 and 10
28	44 and 10
29	45 and 10
30	46 and 10
31	47 and 10
32	48 and 10
33	49 and 10
34	50 and 10
35	51 and 10
36	52 and 10
37	53 and 10
38	54 and 10
39	55 and 10
40	56 and 10
41	57 and 10
42	58 and 10
43	59 and 10
44	60 and

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts.....	70, 10 and 5
Carriage bolts.....	70, 10 and 5
Lag bolts.....	70, 10 and 5
Flange bolts, Nos. 1, 2, 3 and 4.....	70, 10 and 5
Hot-pressed nuts, blank or tapped.....	70, 10 and 5
Hot-pressed nuts, blank or tapped.....	70, 10 and 5
Hexagons.....	70, 10 and 5
C.p.c. and T. square or hex. nuts, blank or tapped.....	70, 10 and 5
Semi-finished hexagon nuts, U.S.S. all sizes.....	70, 10 and 5
Semi-finished hexagon nuts, S.A.E. 1/4 in. to 7/16 in. diameter.....	70, 10 and 5
1/4 in. to 1 in. diameter.....	70, 10 and 5
Larger than 1 in. diameter.....	70, 10 and 5
Store bolts in packages, Pittsburgh.....	75
Store bolts in packages, Cleveland.....	75
Store bolts in bulk, P.g.h.....	83
Store bolts in bulk, Chicago.....	83
Store bolts in bulk, Cleveland.....	83
Tire bolts.....	90 and 5

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.90
F.o.b. Chicago.....	3.00
F.o.b. Birmingham.....	3.05

Small Rivets
(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh.....	70 and 5
F.o.b. Cleveland.....	70 and 5
F.o.b. Chicago and Birmingham.....	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller.....	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller.....	75
Milled headless set screws, cut thread 1/4 in. and smaller.....	75
Upset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. dia. and smaller.....	85
Upset set screws, cut and oval point.....	75 and 10 to 80
Milled studs.....	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Uncropped.....\$40 per gross ton

Alloy Steel Blooms, Billets and Slabs
F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, \$49 a gross ton.

Alloy Steel Bars
Price del'd Detroit is \$52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base.....2.45c.

Delivered price at Detroit is.....2.60c.

S.A.E. Series.....

Numbers.....

2800 (1/4% Nickel).....0.25

2100 (1/2% Nickel).....0.55

2500 (3/4% Nickel).....1.50

2500 (5% Nickel).....2.25

3100 Nickel Chromium.....0.55

3200 Nickel Chromium.....1.35

3300 Nickel Chromium.....3.80

3400 Nickel Chromium.....3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....0.70

4000 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel).....1.05

5100 Chromium Steel (0.80 to 0.90 Chromium).....0.35

5100 Chromium Steel (0.80 to 1.10 Chromium).....0.45

5100 Chromium Spring Steel.....base

6100 Chromium Vanadium Bar.....1.20

6100 Chromium Vanadium Spring Steel.....0.70

Chromium Nickel Vanadium.....1.50

Carbon Vanadium.....0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302
(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)
(Base Prices, f.o.b. Pittsburgh)

Per Lb.

Forging billets.....19.55c.

Rolling slabs.....15c.

Bars.....25c.

Plates.....26c.

Structural shapes.....23c.

Sheets.....33c.

Hot-rolled strip.....20 1/2 c.

Cold-rolled strip.....27c.

Drawn wire.....33c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots
F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Uncropped.....\$29 per gross ton

Carbon Steel Forging Ingots
F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Uncropped.....\$31 per gross ton

Billets, Blooms and Slabs
F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Revolving.....\$27.00

Forging quality.....\$2.00

Delivered Detroit
Revolving.....\$30.00

Forging.....\$5.00

Billets Only F.o.b. Duluth
Revolving.....\$29.00

Forging.....\$4.00

Sheet Bars
F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer.....\$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved.....1.70c.

Universal.....1.70c.

Sheared.....1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh.....1.30c.

F.o.b. Chicago.....1.35c.

F.o.b. Cleveland.....1.35c.

F.o.b. Buffalo.....1.90c.

F.o.b. Birmingham.....1.95c.

Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh.....\$38.00

F.o.b. Cleveland.....39.00

F.o.b. Chicago.....39.00

F.o.b. Anderson, Ind.....39.00

F.o.b. Youngstown.....39.00

F.o.b. Worcester, Mass.....40.00

F.o.b. Birmingham.....41.00

F.o.b. San Francisco.....47.00

F.o.b. Galveston.....44.00

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....	\$31.00
No. 2 fdy., sil. 1.75 to 2.25.....	32.10
Malleable.....	31.90

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....	\$32.50
No. 2 fdy., sil. 1.75 to 2.25.....	33.00
Malleable.....	32.50
Basic.....	32.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$35.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Electric Ferro-silicon

Per Gross Ton Delivered

50% (carloads).....	\$77.50
50% (ton lots).....	85.00
75% (carloads).....	128.00
75% (ton lots).....	136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

6%.....	\$22.75
7%.....	23.75
8%.....	24.75
9%.....	25.75
10%.....	26.75
11%.....	27.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Bessemer Ferro-silicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10%.....	\$27.75
11%.....	28.75
12%.....	29.75
13%.....	30.75

Manganese 1 1/4 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads.....\$1.35 to \$1.45

Ferrotungsten, less carloads, 1.45 to 1.55

Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads.....10.00c.

Ferrocromium, 2% carbon.....16.50c. to 17.00c.

Ferrocromium, 1% carbon.....17.50c. to 18.00c.

Ferrocromium, 0.10% carbon.....19.50c. to 20.00c.

Ferrocromium, 0.06% carbon.....20.00c. to 20.50c.

Ferrovanadium, del., per lb. contained V.....\$2.70 to \$2.90

Ferrocobaltititanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton.....\$137.50

Ferrophosphorus, electric, or blast furnace material, in carloads, 18% Rockdale, Tenn., base, per gross ton with \$2 unitage.....50.00

Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage.....65.00

Ferromolybdenum, per lb. Mo., del. 95c.

Calcium molybdate, per lb. Mo., del. 80c.

Silico spiegel, per ton, f.o.b. furnace, car lots.....\$38.00

Two lots or less per ton.....45.50

Silico-manganese, gross ton, delivered: 2.50% carbon grade.....90.00

2% carbon grade.....96.00

1% carbon grade.....108.00

Spot prices.....\$5 a ton higher

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.....	\$19.50	\$20.00	\$19.00	\$20.50
Bethlehem, Pa.....	19.50	20.00	19.00	20.50
Birdsboro, Pa.....	19.50	20.00	19.00	20.50
Swedeland, Pa.....	19.50	20.00	19.00	20.50
Steelton, Pa.....	19.50	20.00	19.00	20.50
Sparrows Point, Md.....	19.50	20.00	19.00	20.50
Neville Island, Pa.....	19.50	20.00	19.00	20.50
Sharpsville, Pa.....	19.50	20.00	19.00	20.50
Youngstown.....	19.50	20.00	19.00	20.50
Buffalo.....	19.50	20.00	19.00	20.50
Erie, Pa.....	19.50	20.00	19.00	20.50
Cleveland.....	19.50	20.00	19.00	20.50
Toledo, Ohio.....	19.50	20.00	19.00	20.50
Jackson, Ohio.....	20.25	20.25	19.75	20.50
Detroit.....	19.50	20.00	19.00	20.50
Hamilton, Ohio.....	19.50	20.00	19.00	20.50
Chicago.....	19.50	20.00	19.00	20.50
Granite City, Ill.....	19.50	20.00	19.00	20.50
Duluth, Minn.....	19.00	19.00	19.00	19.50
Birmingham.....	14.50	14.50	13.50	19.00
Provo, Utah.....	17.50	17.50	17.00	19.00

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.....	\$20.00	\$20.50	\$19.50	\$21.00
Brooklyn				
From East. Pa. or Buffalo.....	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.				
From East. Pa. or Buffalo.....	20.89	21.39	20.39	21.89
Philadelphia				
From Eastern Pa.....	20.26	20.76	19.76	21.26
Cincinnati				
From Hamilton, Ohio.....	19.51	19.51	19.01	20.01
Canton, Ohio				
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio				
From Hamilton, Ohio.....	20.50	20.50	19.50	20.50
Mansfield, Ohio				
From Cleveland and Toledo..	20.26	20.26	19.26	20.26
Indianapolis				
From Hamilton, Ohio.....	20.77	20.77	19.77	20.77
South Bend, Ind.				
From Chicago.....	20.55	20.55	19.55	20.55
Milwaukee				
From Chicago.....	19.50	19.50	19.00	20.00
St. Paul				
From Duluth.....	20.94	20.94	19.94	20.94
Davenport, Iowa				
From Chicago.....	20.26	20.26	19.26	20.26
Kansas City				
From Granite City.....	21.04	21.04	20.04	21.04

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.\$23.50

GRAY FORGE PIG IRON

Valley furnace.....\$18.00

Pittsburgh district furnace.....18.00

CHARCOAL PIG IRON

Lake Superior furnace.....\$21.00

Delivered Chicago.....34.04

Delivered Buffalo.....24.36

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.25 to \$11.75
No. 2 heavy melting steel	10.25 to 10.75
No. 2 railroad wrought	11.25 to 11.75
Scrap rails	12.25 to 12.75
Rails, 3 ft. and under	13.25 to 13.75
Compressed sheet steel	11.90 to 11.50
Hand bundled sheet steel	10.90 to 10.50
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	7.00 to 7.50
Short shov. turnings	7.00 to 7.50
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Cast iron carwheels	12.00 to 12.50
Heavy breakable cast	11.00 to 11.50
No. 1 cast	12.00 to 12.50
Railr. knuckles and couplers	14.00 to 14.50
Rail, coil and leaf springs	14.00 to 14.50
Roller steel wheels	14.00 to 14.50
Low phos. billet crops	14.25 to 14.75
Low phos. sheet bar crops	14.25 to 14.75
Low phos. plate scrap	14.00 to 14.50
Low phos. punchings	14.00 to 14.50
Steel car axles	14.25 to 14.75

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$9.50 to \$10.00
Automobile hvy. melt. steel	9.00 to 9.50
Shoveling steel	9.50 to 10.00
Hydraulic comp. sheets	8.50 to 9.00
Drop forge flashings	8.00 to 8.50
No. 1 busheling	8.25 to 8.75
Roller carwheels	10.50 to 11.00
Railroad tires	11.50 to 12.00
Railroad leaf springs	10.50 to 11.00
Steel couplers and knuckles	11.00 to 11.50
Coil springs	12.00 to 12.50
Axle turnings (elec. fur.)	10.00 to 10.50
Low phos. punchings	12.00 to 12.50
Low phos. plates, 12 in. and under	12.50 to 13.00
Cast iron borings	5.50 to 6.00
Short shoveling turnings	5.50 to 6.00
Machine shop turnings	5.00 to 5.50
Rerolling rails	11.50 to 12.00
Steel rails, less than 3 ft.	12.00 to 12.50
Steel rails, less than 2 ft.	12.50 to 13.00
Angle bars	10.50 to 11.00
Cast iron carwheels	10.50 to 11.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	9.50 to 10.00

Per Net Ton	
Iron car axles	\$13.50 to \$14.00
Steel car axles	13.50 to 14.00
No. 1 railroad wrought	8.00 to 8.50
No. 2 railroad wrought	8.75 to 9.25
No. 2 busheling	4.50 to 5.00
Locomotive tires, smooth	10.00 to 10.50
Pipe and flues	5.00 to 5.50
No. 1 machinery cast	9.00 to 9.50
Clean automobile cast	8.50 to 9.00
No. 1 railroad cast	8.00 to 8.50
No. 1 agricultural cast	8.00 to 8.50
Store plate	5.00 to 5.50
Grate bars	5.50 to 6.00
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00
No. 2 heavy melting steel	9.00
No. 1 railroad wrought	\$10.50 to 11.00
Bundled sheets	9.50 to 10.00
Hydraulic compressed, new	9.00 to 9.50
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	8.50 to 9.00
Cast borings	5.00 to 5.50
Store plate (steel works)	8.00 to 8.25
Heavy breakable cast	10.00 to 10.50
No. 1 low phos. heavy	14.50 to 15.00
Couplers and knuckles	13.50 to 14.00
Roller steel wheels	13.50 to 14.00
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00 to 8.50
Shafting	17.00 to 17.50
Steel axles	16.00
No. 1 forge fire	9.50 to 10.00
Cast iron carwheels	11.00 to 11.50
No. 1 cast	12.00 to 12.50
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.50 to \$8.00
No. 2 heavy melting steel	6.00 to 6.50
Scrap rails for melting	7.50 to 8.00
Loose sheet clippings	4.00 to 4.50
Bundled sheets	5.50 to 6.00
Cast iron borings	4.00 to 4.50
Machine shop turnings	4.00 to 4.50
No. 1 busheling	5.50 to 6.00
No. 2 busheling	2.25 to 2.75
Rails for rolling	8.50 to 9.00
No. 1 locomotive tires	6.75 to 7.25
Short rails	11.00 to 11.50
Cast iron carwheels	7.50 to 8.00
No. 1 machinery cast	8.75 to 9.25
No. 1 railroad cast	8.00 to 8.50
Burnt cast	5.50 to 6.00
Store plate	5.50 to 6.00
Agricultural malleable	7.50 to 8.00
Railroad malleable	8.50 to 9.00

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.50 to \$10.00
No. 2 heavy melting steel	9.00 to 9.50
Compressed sheet steel	9.00 to 9.50
Light bundled sheet stampings	7.00 to 7.50
Drop forge flashings	8.50 to 9.00
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.75 to 7.25
No. 1 busheling	9.00 to 9.50
Steel axle turnings	9.00 to 9.50
Low phos. billet crops	14.50 to 15.00
Cast iron borings	6.50 to 7.00
Mixed borings and short turnings	6.50 to 7.00
No. 2 busheling	6.50 to 7.00
No. 1 cast	12.00 to 12.50
Railroad grate bars	7.00 to 7.50
Store plate	8.00 to 8.50
Rails for rolling	14.50 to 15.00
Railroad malleable	13.00 to 13.50
Cast iron carwheels	12.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$10.00 to \$10.50
No. 2 heavy melting scrap	8.50 to 9.00
Scrap rails	11.00 to 11.50
New hydraulic, comp. sheets	8.50 to 9.00
Old hydraulic, comp. sheets	7.50 to 8.00
Drop forge flashings	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	8.00 to 8.50
Machine shop turnings	4.50 to 5.00
Knuckles and couplers	11.50 to 12.00
Coil and leaf springs	11.50 to 12.00
Roller steel wheels	11.50 to 12.00
Low phos. billet crops	12.00 to 12.50
Short shov. steel turnings	6.00 to 6.50
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	6.50 to 7.00
Steel car axles	11.50 to 12.00
Iron axles	11.50 to 12.00
No. 1 machinery cast	11.00 to 11.50
No. 1 cupola cast	10.00 to 10.50
Store plate	9.00 to 9.50
Steel rails, 3 ft. and under	12.50 to 13.00
Cast iron carwheels	11.00 to 11.50
Industrial malleable	12.00 to 13.00
Railroad malleable	12.00 to 13.00
Chemical borings	8.00 to 8.50

BOSTON

Dealers' buying prices per gross ton:	
*No. 1 heavy melting steel	\$8.25 to \$8.50
No. 1 heavy melting steel	5.50 to 6.00
*Scrap T rails	8.25 to 8.50
*No. 2 steel	7.25 to 7.50
Breastable cast	5.00 to 5.50
Machine shop turnings	3.10 to 3.50
Bundled skeleton, long	4.75 to 5.00
Forge flashings	4.75 to 5.00
Mixed borings and turnings	1.00 to 1.50
Shafting	12.00 to 12.50
Steel car axles	11.50 to 12.00
Cast iron borings	6.50 to 7.00
Store plate	4.00 to 4.25

Per gross ton delivered consumers' yards:	
Textile cast	\$9.00 to \$9.50
No. 1 machinery cast	9.00 to 9.50
Store plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$8.00 to \$8.00
No. 2 heavy melting steel	7.00 to 7.25
Heavy breakable cast	6.00 to 6.25
No. 1 machinery cast	7.50 to 8.00
No. 2 cast	6.50 to 7.00
Store plate	6.00
Steel car axles	13.50 to 14.00
No. 1 railroad wrought	7.00 to 7.50
No. 1 yard wrought, long	6.00 to 6.50
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rolling	9.00 to 9.50
Short shoveling turnings	2.00 to 2.50
Machine shop turnings	2.00 to 2.50
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	4.00 to 4.50

Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$10.50
No. 1 hvy. cast (cupola size)	9.50
No. 2 cast	8.00

* For direct car loading only.

† Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$9.00 to \$9.50
Scrap steel rails	10.00 to 10.50
Short shoveling turnings	7.00
Store plates	7.00
Steel axles	11.50
Iron axles	11.50
No. 1 railroad wrought	7.00
Rails for rolling	12.50
No. 1 cast	9.50 to 10.00
Tramcar wheels	10.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.50 to \$9.00
No. 1 heavy melting	8.00 to 8.50
No. 2 heavy melting	7.00 to 7.50
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	9.25 to 9.50
Railroad springs	9.50 to 10.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	10.00 to 10.50
Machine shop turnings	2.75 to 3.25
Heavy turnings	5.50 to 6.00
Steel car axles	12.50 to 13.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	6.00 to 6.50
Steel rails less than 3 ft.	11.50 to 12.00
Steel angle bars	9.50 to 10.00
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	9.50 to 10.00
No. 1 railroad cast	8.00 to 8.50
Store plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.50 to \$8.00
Borings and short turnings	4.00 to 4.50

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.I.F. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52%	20c.
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½%	20c.

Per Net Ton Unit	
Tungsten, Chinese, wolframite, duty paid, delivered*	\$17.50 to \$18.50
Tungsten, domestic, scheelite, delivered†	17.00

Per Gross Ton	
Chrome, 45%, Cr ₂ O ₃ , crude, c.i.f. Atlantic Seaboard	\$17.00
Chrome, 48%, Cr ₂ O ₃ , c.i.f. Atlantic Seaboard	20.00

* Quotations nominal in absence of sales.
† Nominal; no supplies available.

Fluorspar

Per Net Ton	
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all-rail shipment	\$13.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	16.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	14.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke	
Per Net Ton	
Furnace, f.o.b. Connellsville	\$3.85
Prompt	
Foundry, f.o.b. Connellsville	\$4.60 to 5.10
Prompt	
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00

Long turnings	\$3.50 to \$4.00
No. 1 machinery cast	10.25 to 10.75
Automotive cast	10.75 to 11.25
Hydraulic comp. sheets	7.50 to 8.00
Store plate	6.50 to 7.00
New factory busheling	6.50 to 7.00
Old No. 2 busheling	3.75 to 4.25
Sheet clippings	4.50 to 5.00
Flashings	6.75 to 7.25
Low phos. plate scrap	7.50 to 8.00

CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$7.00 \$7.40
Rails scrap	8.00 8.90
Machine shop turnings	3.00 3.80
Boiler plate	4.50 4.50
Heavy axle turnings	4.50 4.90
Cast borings	4.00 3.50
Steel borings	2.00 2.00
Wrought pipe	3.50 3.50
Steel axles	7.00 8.00
Axles, wrought iron	7.00 8.00
No. 1 machinery cast	9.00 9.00
Store plate	5.50 5.50
Standard carwheels	7.25 7.00
Malleable	6.75 7.00

Foundry, by-product, Cleveland, delivered	
Foundry, Birmingham	\$9.25
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

Per Net Ton	
Mine run steam coal, f.o.b. W. Pa. mines	\$1.80 to \$2.05
Mine run coking coal, f.o.b. W. Pa. mines	2.05 to 2.25
Gas coal, ¾-in., f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago	
No. 3 industrial fuel oil	3.88c.
No. 5 industrial fuel oil	3.88c.

Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.25c.

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works	
High-heat intermediate Duty Brick	
Pennsylvania	\$45.00
Maryland	45.00
New Jersey	55.00
Ohio	45.00
Kentucky	45.00
Missouri	45.00
Illinois	45.00
Ground fire clay, per ton	7.00

Silica Brick

Per 1000 f.o.b. Works	
Pennsylvania	\$45.00
Chicago District	54.00
Birmingham	55.00
Silica clay, per net ton	8.00

Chrome Brick

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	
Chemically Bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	\$45.00
Chemically Bonded f.o.b. Baltimore and Chester, Pa.	42.50

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c
Structural shapes	3.15c
Soft steel bars and small shapes	2.90c
Reinforcing steel bars	2.90c
Cold-finished and screw stock:	
Rounds and hexagons	*3.45c
Squares and flats	3.45c
Hoops and bands under 1/4 in.	3.20c
Hot-rolled annealed sheets (No. 24)	3.30c
25 or more bundles	3.30c
Galv. sheets (No. 24), 25 or more	3.95c
bundles	3.95c
Hot-rolled sheets (No. 10)	2.95c
Galv. corrug. sheets (No. 28), per	
square (more than 3750 lb.)	*3.69
Spikes, large	2.90c
Track bolts, all sizes, per 100 count,	
65 per cent off list.	
Machine bolts, 100 counts,	
65 per cent off list.	
Carriage bolts, 100 counts,	
65 per cent off list.	
Nuts, all styles, 100 counts,	
65 per cent off list.	
Large rivets, base per 100 lb.	*\$3.50
Wire, black, soft ann'd, base per	
100 lb.	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.334
Cement coated nails, per keg	*2.334

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.
*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	2.20c
Soft steel bars	2.95c
Cold-fn. steel bars:	
Rounds and hexagons	3.50c
Flats and squares	3.50c
Hot-rolled strip	3.50c
Hot-rolled annealed sheets (No. 24)	3.50c
Galv. sheets (No. 24)	4.55c
Hot-rolled sheets (No. 10)	3.05c
Spikes (keg lots)	3.50c
Track bolts (keg lots)	4.65c
Rivets, structural (keg lots)	3.65c
Rivets, boiler (keg lots)	3.75c
Machine bolts	Per Cent Off List
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap or	
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	70 and 10
Cut point set screws	70 and 10
Flat head bright wood screws	37 1/2 and 10
Spring cotter pins	50
Store bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and	
smaller	57 1/2
Wrought washers	*\$4.50 off list
No. 8 black ann'd wire per 100 lb.	*\$3.85
Com. wire nails, base per keg	3.05
Cement c'd nails, base per keg	3.05

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b., Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.40c
Structural shapes	3.37c
Soft steel bars, small shapes	3.22c
Iron bars	3.22c
Iron bars, swed. charcoal	6.75c to 7.25c
Cold-fn. shafting and screw stock:	
Rounds and hexagons	3.77c
Flats and squares	4.27c
Cold-rolled; strip, soft and quarter	
hard	3.32c
Hoops	3.52c
Bands	3.52c
Hot-rolled sheet (No. 10)	3.27c
Hot-rolled ann'd sheets (No. 24)	3.85c
Galvanized sheets (No. 24)	4.50c
Long term sheets (No. 24)	5.20c
Standard tool steel	11.00c
Wire, black annealed (No. 10)	3.40c
Wire, galv. (No. 10)	3.75c
Tire steel, 1 x 1/2 in. and larger	3.65c
Open hearth spring steel	4.00c to 10.00c
Common wire nails, base, per keg	*\$3.21

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c
Bars, soft steel or iron	3.19c
Cold-fn. rounds, shafting, screw	
stocks	3.74c
Hot-rolled annealed sheets (No. 24)	4.09c
Galv. sheets (No. 24)	4.52c
Hot-rolled sheets (No. 10)	3.29c
Black corrug. sheets (No. 24)	4.09c
*Galv. corrug. sheets	4.64c
Structural rivets	3.99c
Boiler rivets	4.09c
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws	
fittings up bolts, bolt ends, plow bolts,	
hot-pressed nuts, square and hexagon,	
tapped or blank, semi-finished nuts:	
All quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	2.95c
*Structural shapes	2.95c
*Soft steel bars, small shapes, iron	2.90c
bars (except bands)	2.90c
*Reinforc. steel bars, sq. twisted	2.95c
and deformed	2.95c
*Cold-finished steel bars	3.75c
*Steel hoops	3.40c
*Steel bands, No. 12 and 3/16 in.	
incl.	3.15c
Spring steel	5.00c
*Hot-rolled anneal. sheets (No. 24)	3.52c
*Galvanized sheets (No. 24)	4.25c
*Hot-rolled annealed sheets (No. 10)	3.05c
Diam. pat. floor plates, 1/4 in.	4.95c
Swedish iron bars	6.25c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over. †For 50 bundles or over. ‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c
Soft steel bars	2.95c
Reinforc. steel bars	2.10c
Cold-finished steel bars	3.40c
Flat-rolled steel under 1/4 in.	3.36c
Cold-finished strip	3.00c
Hot-rolled annealed sheets (No. 24)	3.96c
Galvanized sheets (No. 24)	4.61c
Hot-rolled sheets (No. 10)	3.11c
Hot-rolled 3/16 in. 24 to 48 in. wide	
sheets	3.56c
Black ann'd wire, per 100 lb.	\$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras. †Outside delivery 10c. less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.40c
Bars, soft steel or iron	3.15c
New billet reinforc. bars	3.25c
Rail steel reinforc. bars	3.25c
Hoops and bands, 3/16 in. and	
lighter	3.45c
Cold-finished bars	3.75c
Hot-rolled annealed sheets (No. 24)	4.00c
Galv. sheets (No. 24)	4.70c
Hot-rolled sheets (No. 10)	3.20c
Structural rivets	4.35c
Small rivets	.55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000	
lb. or over)	\$2.91
Com. wire nails, base per keg:	
1 to 24 kegs	3.50
25 to 50 kegs	3.30
Large quantities	3.10
Cement c'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	Not per 100 Ft.
Seamless steel boiler tubes, 2-in.	\$19.03
4-in.	44.96
Lap-welded steel boiler tubes, 2-in.	18.10
4-in.	42.32

BUFFALO

	Base per Lb.
Plates	3.37c
Struc. shapes	3.25c
Soft steel bars	3.09c
Reinforcing bars	2.90c
Cold-fn. flats and sq.	3.55c
Round and hex.	3.55c
Cold-rolled strip steel	3.19c
Hot-rolled annealed sheets (No. 24)	4.05c
Heavy hot-rolled sheets, 3/16 in.	
24 to 48 in. wide	3.62c
Galv. sheets (No. 24)	4.70c
Bands	3.42c
Hoops	3.42c
Hot-rolled unannealed sheets	3.17c
Com. wire nails, base per keg	\$3.35
Black wire, base per 100 lb.	3.55

BOSTON

	Per Lb. Base
Beams, channels, angles, tees, zees	3.52c
H beams and shapes	3.52c
Plates—sheared, tank and univ. mill.	
1/4 in. thick and heavier	3.53c
Floor plates, diamond pattern	5.33c
Bar and bar shapes (mild steel)	3.30c
Bands 3/16 in. thick and	
No. 12 ga. incl.	3.60c to 4.60c
Half rounds, half ovals, ovals and	
bevels	4.55c
Tire steel	4.55c
Cold-rolled strip steel	3.245c
Cold-finished rounds, squares and	
hexagons	3.85c

Cold-finished flats	3.70c
Blue annealed sheets, No. 10 gal.	3.60c
One pass cold-rolled sheets No. 24	
ga.	4.15c
Galvanized steel sheets, No. 24 ga.	4.85c
Lead coated sheets, No. 24 ga.	5.80c

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.31c
Soft steel bars	2.95c
Hot-rolled strip	3.41c
Hot-rolled sheets (No. 10)	3.16c
Hot-rolled annealed sheets (No. 24)	3.96c
Galvanized sheets (No. 24)	4.66c
Cold-finished steel bars	3.61c
Cold-rolled strip	3.30c
Structural rivets (keg lots)	3.86c
Boiler rivets (keg lots)	3.96c
Track spikes (keg lots)	3.71c
Track bolts (keg lots)	4.86c
Black annealed wire	3.10c
Com. wire nails	2.90c
Cement coated nails	2.90c
Per Cent Off List	
Machine bolts	70
Carriage bolts	70
Hot-pressed nuts, sq. and hex., tapped	
or blank (keg lots)	70

Prices given above are delivered Milwaukee. On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on order of 400 to 3499 lb. On cold-finished bars the prices are for orders of 200 to 499 lb.

PACIFIC COAST

	Base per Lb.
	Fan Fran- Los cisco Angeles Seattle
Plates, tank and	
U. M.	3.55c 3.60c 3.55c
Shapes, standard	3.55c 3.60c 3.55c
Soft steel bars	3.60c 3.60c 3.60c
Reinforcing bars	
f.o.b. cars dock	
Pacific ports	2.45c 2.45c 2.45c
Hot-rolled annealed	
sheets (No. 24)	4.40c 4.35c 4.40c
Hot-rolled sheets	
(No. 10)	3.75c 3.70c 3.75c
Galv. sheets (No. 24)	
24)	5.00c 4.95c 5.00c
Cold finished steel:	
Rounds	5.95c 5.85c 6.00c
Squares and	
hexagons	7.20c 7.10c 7.25c
Flats	7.70c 7.60c 7.25c
Common wire nails	
—base per keg	
—less carload	\$3.30 \$3.40 \$3.30

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

	Base per Lb.
High speed	57c
High carbon chrome	37c
Oil hardening	22c
Extra	17c
Regular	14c

Weekly Indications of Steel Activity

FROM THE IRON AGE

	Apr. 9, 1935	Apr. 2, 1935	Mar. 12, 1935	Apr. 10, 1934	Average, Year to Date 1935	1934
Steel ingot operations—Per cent of capacity	46.0	47.0	47.5	49.5	49.1	41.9
	Apr. 9, 1935	Week Ended Apr. 2, 1935	Mar. 12, 1935	Apr. 10, 1934	Year to Date 1935	1934
Fabricated structural steel awards	10,600	8,300	6,450	12,160	190,113	221,175
Fabricated plate awards	2,850	1,520	1,325	1,350	26,955	30,682
Sheet steel piling awards		350	0	1,700	3,765	15,195
Reinforcing bar awards	1,800	1,735	2,250	7,555	58,735	64,080



Plant Expansion and Equipment Buying

Large Buying of Machine Tools by Heavy Industries Looms—Sentiment Better

THE steel industry appears to be the heaviest prospective buyer of machine tools at the present time. Some purchases have been made in the last month and a number of other companies are quietly negotiating for equipment. Part of this business has originated as a result of sheet and strip mill construction.

Railroad activity has improved largely because of the program of the Santa Fe. This road is now inquiring for items for use all over its system.

Automotive demand is temporarily quiet, but considerable business is in prospect for the latter half of the quarter.

◀ NORTH ATLANTIC ▶

Argus Gas Stations, Inc., affiliated with Argus Gas & Oil Sales Co., Inc., 136 Flatbush Avenue Extension, Brooklyn, has acquired property of Cunningham Iron Works, Long Island City, 100 x 320 ft., for new bulk oil and gasoline plant, to include steel tanks and other facilities. Cost over \$40,000 with equipment.

American Can Co., 230 Park Avenue, New York, has asked bids on general contract for new one-story plant at Geneva, N. Y. Cost over \$60,000 with equipment.

Coal Carburetor Corp., New York, has been organized by Thornton W. Price, 954 West Seventh Street, Plainfield, N. J., and Carl M. Legg, 415 Lincoln Avenue, Highland Park, N. J., to manufacture heating and power equipment.

Sterling Petroleum Products, Inc., Mass-peth, L. I., has leased about 35,000 sq. ft. on Nurge Avenue, for new bulk oil storage and distributing plant.

Hemphill Diesel Engineering Schools, Inc., 500 Fifth Avenue, New York, has leased one-story factory, 25,000 sq. ft. floor space, at Long Island City, for new mechanical and instruction plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 16 for 99 arc-welding outlet panels with reactors (Schedule 4751) for Brooklyn Navy Yard; airtight and watertight doors and airlock, watertight hatches, etc. (Schedule 4646) for Brooklyn and Philadelphia yards; until April 19, 21 rotary hand pumps and spare parts (Schedule 4689), indicator and engine order telegraph systems and spare parts (Schedule 4663) for Brooklyn, Philadelphia and Charleston yards; two motor driven Diesel oil purifiers and spare parts (Schedule 4719), 410 tumbler-type switches and seven inclosed lever switches (Schedule 4710) for Brooklyn and Charleston yards; 10 portable arc-

welding sets (Schedule 4725) for Brooklyn and San Diego yards; 840 electric ventilating fans and spare parts (Schedule 4693) for Brooklyn and Mare Island yards.

Colonial Beacon Oil Co., Inc., 155 East Forty-fourth Street, New York, has revised plans for new bulk oil storage and distributing plant at Patchogue, L. I. Cost over \$50,000 with steel tanks and other equipment.

Signal Supply Officer, Army Base, Brooklyn, asks bids until April 15 for 102 armature assemblies (Circular 107), 36 field coil sets and 24 field coil assemblies (Circular 108).

Board of Directors, Monmouth Memorial Hospital, Long Branch, N. J., Bertram H. Borden, vice-president, has plans for new power plant and mechanical laundry. Cost about \$68,000 with equipment. Epple & Kahrs, 17 Washington Street, Newark, N. J., are architects.

Board of Education, Teaneck, N. J., plans manual training department in new two-story school, for which bids will soon be asked on general contract. Fund of \$635,000 is being arranged. Hacker & Hacker, 210 Main Street, Fort Lee, N. J., are architects.

Department of Parks and Public Property, City Hall, Newark, N. J., asks bids until April 15 for improvements in power house, rear of City Hall Annex. Runyon & Carey and Joseph Di Stasio, 33 Fulton Street, are consulting engineers.

Corn Products Sales Co., 401 North Broad Street, Philadelphia, a subsidiary of Corn Products Refining Co., 17 Battery Place, New York, has purchased two-story factory, about 30,000 sq. ft. floor space, at Frankford Avenue and Palmer Street, and will remodel for branch plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 16 for three stress relieving furnaces

(Schedule 4711); until April 19, one motor-driven gear-testing machine (Schedule 4746) for Philadelphia Navy Yard; 1606 air hose couplings (Schedule 4669) for Philadelphia, Norfolk and Western yards.

Eagle Belt Lacer Co., Stratford, Conn., recently organized, has leased building at 1245 Stratford Avenue for manufacture of belt lacing machines and carded belt hooks. J. G. Kall is president and treasurer; E. I. Kall, vice-president; and H. Calhoun, secretary.

◀ NEW ENGLAND ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two steel radio towers for Boston Navy Yard (Specification 7907).

School Board, Turners Falls, Mass., plans manual training department in new two-story high school. Cost about \$150,000. Harold E. Mason, 15 Prospect Street, Leominster, Mass., is architect.

Eastern Massachusetts Street Railway Co., 38 Chauncy Street, Boston, has plans for new two-story motor bus service, repair and garage building, 120 x 180 ft., at Salem, Mass. Cost about \$100,000 with equipment.

Bridgeport Plating & Polishing Works, Inc., Bridgeport, Conn., has been organized by Anthony Bonazzo, 875 Hallett Street, and Philip Christiana, 430 Park Street, to operate a metal plating and polishing works, and manufacture metal specialties.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 16 for two electric-operated tiering machines (Schedule 4544) for Boston Navy Yard; until April 19, three motor-driven buffing and polishing machines (Schedule 4733), and 5000 tumbler-type switches (Schedule 4706) for Portsmouth, N. H., yard.

Board of Selectmen, Abington, Mass., plans manual training department in new two-story high school, to replace structure recently destroyed by fire. Cost over \$150,000. J. William Beal Sons, 185 Devonshire Street, Boston, are architects.

Remington-Rand, Inc., Bridgeport, Conn., manufacturer of adding and calculating machines, parts, carbon papers, etc., has asked bids on general contract for one-story and basement addition, 80 x 300 ft. Cost over \$75,000 with equipment.

◀ OHIO AND INDIANA ▶

Washington Brewery Co., West Second Avenue and Perry Street, Columbus, Ohio, has plans for multi-story addition. Cost over \$50,000 with equipment. Bassett & Trussel, 257 East Broad Street, are architects.

Western Automatic Machine Screw Co., Lane Avenue and Baltimore & Ohio Railroad, Lorain, Ohio, with headquarters at Cleveland, has plans for one-story addition,

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190 x 209 ft. Cost over \$100,000 with equipment. B. C. Franklin is general manager.

Safety Flasher, Inc., Columbus, Ohio, has been organized by Harry D. Silver and Owen M. Shattuck, care of D. O. Sprankle, 50 East Broad Street, representative, to manufacture electric flashing devices and other electrical equipment.

Department of Public Utilities, City Hall, Cleveland, William J. Rogers, director, is planning extensions and improvements in municipal electric light and power plant, including new generating machinery and auxiliary equipment, boiler units and accessories, new cable lines and other work. Immediate program is estimated at \$700,000 with equipment, and ultimate work at

\$3,000,000. City Council is considering a bond issue in latter amount for project.

Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until April 15 for 83,600 wrought iron bolts, 167,200 iron washers, 16,000 galvanized strap fasteners, 1872 lb. ridge roll iron, 232,101 lb. galvanized corrugated sheet iron, 42,200 lb. galvanized sheet iron (Circular 628); until April 16, three floor-type, motor-driven sensitive drill presses (Circular 641), 375 towing landing bear rings (Circular 635), 300 airspeed tube assemblies (Circular 640); until April 17, propeller hub rear cone seat laps, rear cone lapping fixture assemblies and rear cone laps (Circular 642), 350 propeller blade balance plug assemblies (Circular 644), 5000 flexible conduit (Circular 643); until April 23,

rate of climb indicator assemblies in lots of 360 to 800 (Circular 623), 50 cock assemblies (Circular 633).

United States Engineer Office, Zanesville, Ohio, asks bids until April 25 for traveling cranes and hoists, and trolleys and hoists for Clendening, Charles Mill, Senecaville, Beach City, Tappan, Mohawk and Wills Creek dams (Circular 79).

Schwitzer-Cummins Co., 1125 Massachusetts Avenue, Indianapolis, manufacturer of fans and kindred equipment for automobiles, tractors, etc., has let general contract to E. B. Ball & Son, 1131 North Tacoma Avenue, for one-story addition. Cost over \$25,000 with equipment.

Steelcraft Industries, Inc., Cincinnati, recently organized by B. and R. Phillips and H. N. Peal, has leased space at 3140 Beekman Street, for manufacture of household refrigerators.

◀ **WESTERN PA. DIST.** ▶

American Oil Co., Grant Building, Pittsburgh, has acquired property near Beck's Run, Pa., fronting on Monongahela River, as site for new bulk oil storage and distributing plant, with steel tanks and other equipment. Cost over \$65,000. Company headquarters are in American Building, Baltimore.

Gas-Oil Products Co., Inc., Lucinda, Pa., has plans for new liquid gas plant for production of butane and propane gas, to be marketed in heavy steel containers. Gas engine power house, fractionating towers and other operating departments will be included. Plant will operate with natural gas as fuel. Cost over \$50,000 with equipment. W. Shreffler is superintendent.

Homestead Ice Co., 207 West Seventh Avenue, Pittsburgh, has approved plans for new multi-story brewing plant at West Homestead, scheduled for completion early in fall. Cost over \$100,000 with equipment. Company is arranging for change of name to Homestead Ice & Brewing Co.

◀ **BUFFALO DISTRICT** ▶

Genesee Brewing Co., 100 National Street, Rochester, N. Y., has let general contract to J. B. Pike & Sons, Inc., 1 Circle Street, for six-story and basement addition, 80 x 100 ft. Cost close to \$100,000 with equipment.

Nicholas G. Heary, Fredonia, N. Y., formerly general manager for Red Wing Grape Juice Co., is organizing company to build a local food products canning plant. Site has been purchased and plans for one-story plant are under way. Cost over \$30,000 with equipment.

Rochester Aeronautical Corp., Chili, N. Y., has been organized by Hildegard K. Barton, 421 Westland Avenue, and Philip D. Ungerer, 420 Westland Avenue, both Rochester, N. Y., to manufacture airplanes and parts.

Board of Education, City Hall, Buffalo, plans addition to Boys' Continuation School, for new general mechanical shop, electrical shop and other shop units, drafting room, etc. Fund of \$72,000 has been authorized.

◀ **SOUTHWEST** ▶

Board of Education, Library Building, Kansas City, Mo., plans manual training department in new three-story and basement high school at Meyer Boulevard and Swope Parkway. Cost about \$600,000. Wight & Wight, First National Bank Building, are architects. Board is also considering addition to manual training high school at Fifteenth Street and Forest Avenue. Cost close to \$100,000 with equipment. Charles A. Smith, Finance Building, is architect for last noted project. George Melcher is school superintendent.

Power Grip Wrench Co., Shawnee, Okla., has been organized by Herbert J. Fox and Andrew J. Morgan, Shawnee, to manufacture wrenches and other tools.

General Motors Corp., Detroit, has acquired property in Leeds district, Kansas

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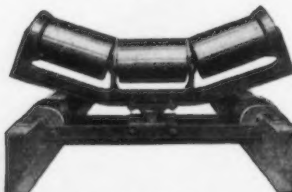
FREE-TURNING, accurately made idlers assure the belt conveyor a good roadbed for economical operation . . . minimum friction loads . . . long belt life . . . and the lowest maintenance cost. Link-Belt makes a full line of anti-friction, pressure-lubricated idlers, as well as all necessary machinery and driving parts for the complete conveyor.

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Link-Belt Anti-Friction Type 70 Belt Conveyor Idler



Link-Belt Anti-Friction Type 5 Self-Aligning Idler, for automatically training the belt, hereby materially lengthening its life.



Link-Belt Anti-Friction Type 40 Belt Conveyor Idler.

City, Mo., to be used in part for expansion in local assembling plant of Chevrolet Motor Co. Division. Portion of site will be used for new one-story building for motor parts storage and distribution.

Arkansas Power & Light Co., Pine Bluff, Ark., has authorized construction of new power transmission line from Plummerville to El Paso, Ark., about 40 miles. Cost about \$150,000 with substation and service facilities.

Board of Works, Topeka, Kan., plans new one-story steel hangar, 80 x 104 ft., at municipal airport, with repair and reconditioning facilities. Cost about \$30,000 with equipment. Roy A. Finney, New England Building, is engineer.

Board of Trustees, College of Industrial

Arts, Denton, Tex., has plans for one-story top addition to present two-story building, 110 x 145 ft. Cost over \$65,000. Preston M. Green, 417 Bewley Building, Fort Worth, Tex., is architect.

◀ SOUTH ATLANTIC ▶

Bureau of Yards and Docks, Navy Department, Washington, plans expansion at Naval Air Station, Pensacola, Fla., including hangars, with repair and reconditioning shops, main repair and assembly shop for aircraft work, general equipment storage and distributing building, student instruction buildings and other structures. Fund of \$3,000,000 is being arranged.

Lance Packing Co., Charlotte, N. C.,

food canner and packer, plans three story addition, 50 x 65 ft. Cost about \$30,000 with equipment. George C. Bell, Piedmont Building, is architect and engineer.

Roaring River Furniture Co., Roaring River, N. C., plans rebuilding part of plant recently destroyed by fire. Loss over \$100,000 with woodworking, veneer and other machinery.

Jones Brothers Bakery, Inc., Greenboro, N. C., plans extensions and improvements, with installation of traveling ovens, conveyors and other equipment. Cost close to \$30,000 with machinery.

Calhoun Lime Co., St. Matthews, S. C., is considering installation of additional equipment, including rotary dryers and auxiliaries. B. E. Benson is head.

◀ MIDDLE WEST ▶

Chicago Flexible Shaft Co., 5600 West Roosevelt Road, Chicago, has let general Contract to All Building Construction Co., 1225 South Independence Boulevard, for one-story addition, 108 x 138 ft. Cost over \$75,000 with equipment. S. N. Crowen Associates, 30 North La Salle Street, are architects.

Automotive Equipment Corp., 316 Rialto Square Building, Joliet, Ill., has been organized by C. D. Knight and L. A. Sherwood, to manufacture automobile equipment.

Great Western Steel Co., 2300 West Fifty-eighth Street, Chicago, has let contract to Smedberg-Nordell, Inc., 3937 Indiana Avenue, for one-story addition, 94 x 130 ft. F. C. Foltz, 38 South Dearborn Street, is architect.

Public Utility Commission, Owatonna, Minn., plans addition to power plant, primarily for expansion in boiler department, with installation of new boiler unit, pumping machinery and auxiliary equipment. Cost about \$70,000. Frank Snyder is plant superintendent.

Construction Service, Veterans' Administration, Washington, asks bids until May 7 for incinerator equipment for institution at Hot Springs, S. D.

Montrose School District, Montrose, Colo., plans manual training department in new two-story junior high school. Cost close to \$100,000. T. H. Buell & Co., 730 Fourteenth Street, Denver, are architects.

◀ MICHIGAN DISTRICT ▶

Frankenmuth Brewing Co., Frankenmuth, Mich., has let general contract to Henry C. Weber Construction Co., Bay City, Mich., for one-story mechanical-bottling works. Cost close to \$30,000 with equipment.

Trenton Valley Distillers Corp., Trenton, Mich., has let general contract to Culbertson & Kelly Co., 872 West Milwaukee Avenue, Detroit, for one story addition, 75 x 210 ft., primarily for storage and distribution. Cost about \$50,000 with equipment.

Superior Industries Corp., 19924 John R. Street, Detroit, has been organized by James D. Ligon, 167 Hollywood Street West, and associates, to manufacture tools, dies and kindred products.

Hinckley-Myers Co., Jackson, Mich., manufacturer of garage equipment, is considering one-story addition, including improvements in present plant. Cost over \$25,000 with machinery.

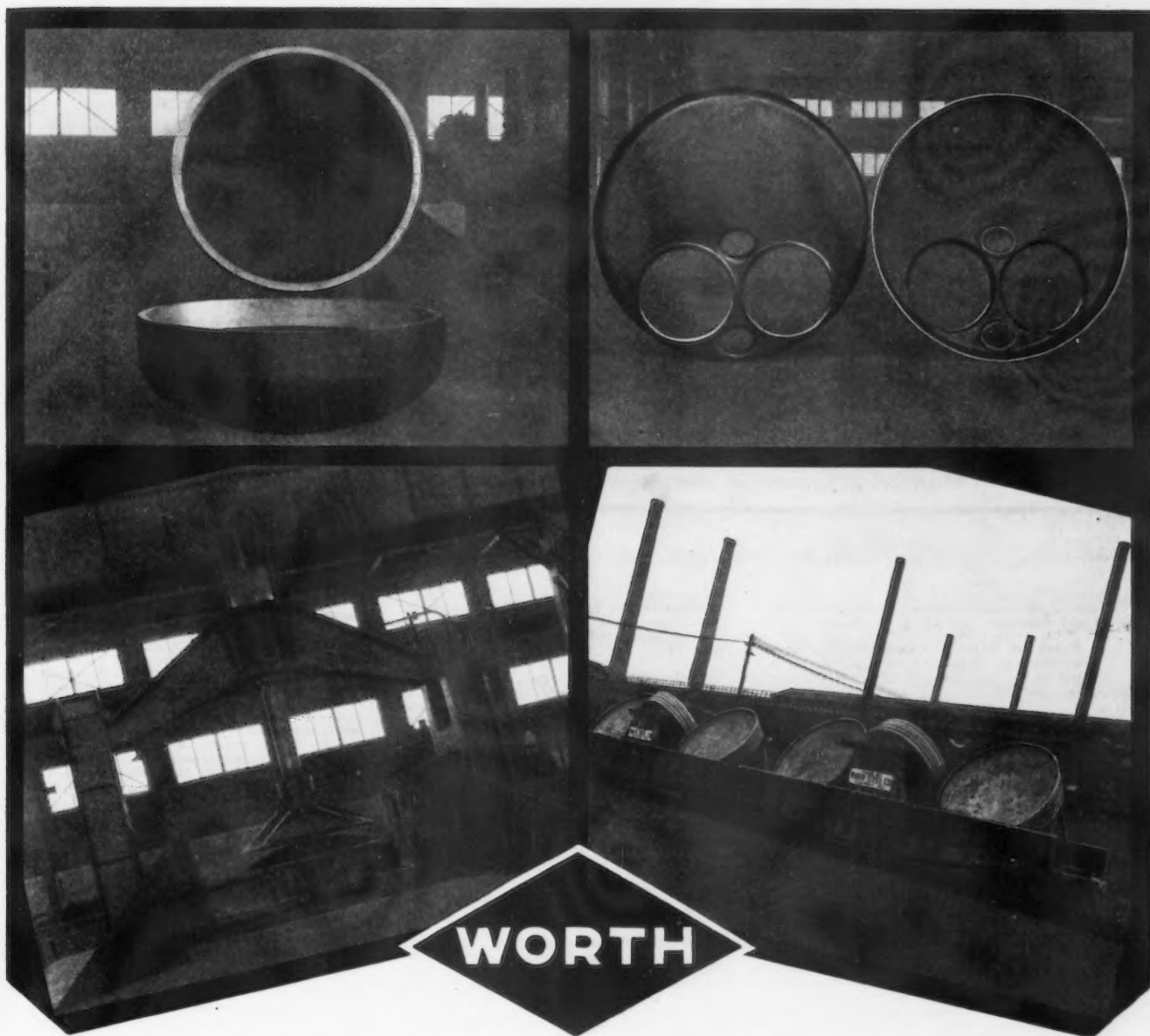
Thomas Welding Laboratories, Inc., Highland Park, Detroit, has succeeded to local plant and business of Walter J. Thomas & Co. Expansion is being carried out, totaling about 20,000 sq. ft. floor space, to include installation of new equipment.

◀ WASHINGTON DIST. ▶

Magic City Granite Co., 925 Fourth Street, S. E., Roanoke, Va., P. E. Koontz, head, has plans for one-story stone-cutting, polishing and finishing shop. Cost about \$35,000 with equipment.

Water Department, Salisbury, Md., plans

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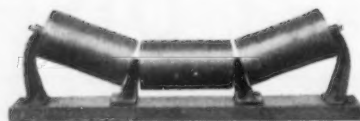
BELT CONVEYORS
IDLER—ALL TYPES

BUCKET ELEVATORS
PORTABLE CONVEYORS

ENGINEERING ASSEMBLIES
GATES (BIN AND HOPPER)

CRUSHERS
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ROBINS CONVEYING BELT CO.
15 Park Row, New York City
Branches in principal cities

new steel storage tank for water system. Clark Gardner, city clerk, in charge.

Board of District Commissioners, District Building, Washington, asks bids until April 26 for one gap bed lathe for District penal institution.

Construction Service, Veterans' Administration, Washington, asks bids until April 23 for new boilers and boiler plant equipment for installation in Virginia.

Gunther Brewing Co., Inc., 1211 South Conkling Street, Baltimore, has plans for one-story addition to brewing plant, 40 x 75 ft. Cost over \$30,000 with equipment. Charles H. Osborne, 222 West Franklin Street, is engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 16 for seamless steel tubing (Schedule 4671), wire rope and seizing strand (Schedule 4632); until April 19, brass, bronze, lead and copper wire, and steel wire (Schedule 4670), 13,240 electric flashlights (Schedule 4674), fuses and fuse elements (Schedule 4661); until April 23, 24 stress relieving furnaces (Schedule 4720), and steel boiler plates (Schedule 4722) for Eastern and Western Navy Yards; until April 19, bronze steam hose (Schedule 4668) for Brooklyn and Mare Island yards; until April 16, one Diesel engine-driven generator and spare parts (Schedule 4656) for Washington yard; until April 26, one Diesel engine-generator equipment (Schedule 4598).

◀ SOUTH CENTRAL ▶

United States Rubber Co., Broadway and Fifty-eighth Street, New York, has work under way on new four-story building at New Orleans, to be occupied under lease for new factory branch, storage and distributing plant. Cost over \$50,000 with equipment. George Christy, 302 Walnut Street, New Orleans, is architect.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until April 17 for furnishing, fabricating and delivering bulkhead gates and auxiliaries for draft tube outlet, Wheeler hydro-electric power plant.

Wiley Grantham, Crystal Springs, Miss., is at head of project to erect new food packing plant, one-story, 40 x 160 ft. Cost about \$30,000 with equipment. Site has been secured.

United States Engineer Office, Memphis, Tenn., asks bids until April 17 for one 32-in. dredging pump and spare parts (Circular 312).

McMinnville Gas Co., McMinnville, Tenn., has been acquired by new interests, headed by R. C. Douglas, 22 West Monroe Street, Chicago, operating as United Utilities Co. Extensions and improvements will be made in plant and system, including installation of new butane gas equipment.

Pace & Latimer, Alexandria, La., plans to establish a plant in Houston, Tex., for manufacture of Freeway drill pipe, coring tools, cone rock bits and other improved devices for putting down oil and other wells.

◀ PACIFIC COAST ▶

Southwest Welding & Mfg. Co., 3201 West Mission Road, Alhambra, Cal., manufacturer of mechanical equipment and operating a general welding works, has let contract to Pennsylvania Iron & Steel Co., 2308 Santa Fe Avenue, Los Angeles, for one-story addition, 70 x 210 ft. Cost close to \$30,000 with equipment.

Port of Stockton Grain Terminal Association, Stockton, Cal., Eugene D. Wilkinson, president, has plans for addition to grain terminal and distributing plant, totaling about 144,000 sq. ft. floor space. Cost \$100,000 with elevating, conveying and other equipment.

Bureau of Reclamation, Denver, asks bids until April 18 for one transfer car for Boulder power plant, Boulder Dam, Boulder Canyon Project, Arizona-California-Nevada (Specification 673-D).

Atlas Foundry & Machinery Co., 3012 South Wilkeson Street, Tacoma, Wash., has awarded general contract to Ketner Brothers, 419 St. Helens Avenue, for two-story addition, 50 x 100 ft., for expansion in pattern-making and other departments.

Placerville Fruit Growers' Association, Placerville, Cal., has asked bids on general contract for addition for precooling and cold storage unit, including improvements in packing plant. Cost over \$200,000 with equipment. Masten, Hurd & Rothe, 233 Post Street, San Francisco, are architects; Paul Scherrer, last noted address, is mechanical engineer.

South Pasadena City High School District, South Pasadena, Cal., has asked bids on general contract for one-story shop building at high school at Diamond and Rawlins Streets. Cost close to \$40,000 with equipment. Marsh, Smith & Powell, Architects' Building, Los Angeles, are architects.

Horluck Brewing Co., Westlake and Mercer Avenues, Seattle, has filed plans for one-story mechanical-bottling works, 70 x 120 ft. Cost about \$35,000 with machinery. Joseph Wohleb, Chambers Building, Olympia, Wash., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 16 for 56 oxy-acetylene cutting outfits (Schedule 4654) for Puget Sound Navy Yard.

Comet Oil Tools Service Co., Glendale, Cal., has been organized by M. O. and L. E. Johnston, Glendale, and associates, to manufacture oil-well drilling tools and equipment.

◀ FOREIGN ▶

Chad Valley Co., Ltd., Harborne, Birmingham, England, manufacturer of mechanical toys, etc., has acquired about 20 acres in another suburb of city as site for new plant. Cost over \$250,000 with equipment.

Municipal Council, Johannesburg, South Africa, has authorized extensions and improvements in Rand Airport, including new hangars, repair and reconditioning shops, oil storage and distributing buildings, and other field structures. Fund of \$850,000 has been approved.

Courtaulds, Ltd., London, England, manufacturer of cellulose rayon products, viscose papers, etc., plans new rayon mill on 340-acre tract acquired at Preston, England, with power house, machine shop and other mechanical departments. Proposed to have plant ready in about 18 months. Cost over \$15,000,000 with equipment. Company is also arranging early construction, in cooperation with Cellophane Co. of France, Ltd., Paris, of new multi-unit plant for production of transparent viscose papers. Cost more than \$5,000,000 with machinery. Company has work under way on new fibre plant at Greenfield, North Wales, to cost more than \$1,000,000. Entire 1935 expansion will cost about \$30,000,000.

TRADE NOTES

Coats Machine Tool Co., Ltd., foreign agent of Murchey Machine & Tool Co., Detroit, is now located in the Coastal Chambers, 15 Elizabeth Street, Westminster, London, SW1.

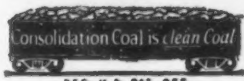
Republic Steel Corp., Youngstown, has removed Seattle district sales offices to the White-Henry-Stuart Building. C. D. Winter is in charge of the office as district sales manager.

The United States Galvanizing & Plating Equipment Corp., 32 Stockton Street, Brooklyn, on May 1, will move main office and plant to 27-41 Heyward Street, Brooklyn. Increased space and improved facilities for manufacture will be provided. The company specializes in development and manufacture of fully automatic, semi-automatic and manually-operated equipment and apparatus for plating, cleaning, drying and allied operations.

Semet-Solvay Co., and affiliated corporations, including Edgewater Coal Co., Inc., Ashland By-product Coke Co., Kingston-Pocahontas Coal Co., Inc., Iron-ton By-product Coke Co. and Semet-Solvay Engineering Corp., have removed their offices from 61 Broadway to 40 Rector Street, New York.

The Celebrated
ATWATER POCAHONTAS
SMOKELESS COAL

will now be sold exclusively by
THE CONSOLIDATION COAL COMPANY
INCORPORATED



WE are pleased to announce jointly that the high grade, low volatile Pocahontas coal which for many years has been marketed by William C. Atwater & Company, Incorporated, of New York, will, under a long term contract between our respective Companies, be exclusively sold on and after April 1, 1935, in all markets by The Consolidation Coal Company, Incorporated.

This coal is produced by The American Coal Company of Allegany County and by the Mill Creek Coal & Coke Company at their mines in Mercer and McDowell Counties in Southern West Virginia, which properties were among the first to be developed in the now famous Pocahontas Region. Because of their inherent high quality and the careful mining and thorough tippable preparation given them, the coals from these mines have achieved

and maintained an enviable position in the Smokeless coal markets. Their production and preparation, as heretofore, will be under the supervision of William C. Atwater & Company, Incorporated, who will continue as Managing Agents for the Producers.

The Consolidation Coal Company, Incorporated, has been producing and selling coal for seventy years and because of the diversification of its coals, its marketing ramifications extend into many markets. The addition to its line of this Atwater coal, which it will sell under the name of "CONSOLIDATION'S ATWATER POCAHONTAS," enables it to bring to its customers and to the customers of William C. Atwater & Company, Incorporated, a variety of coals, a broad and dependable service and a convenience of buying which is unparalleled.

WILLIAM C. ATWATER & COMPANY

INCORPORATED

No. 1 Broadway, New York, N. Y.

THE CONSOLIDATION COAL COMPANY

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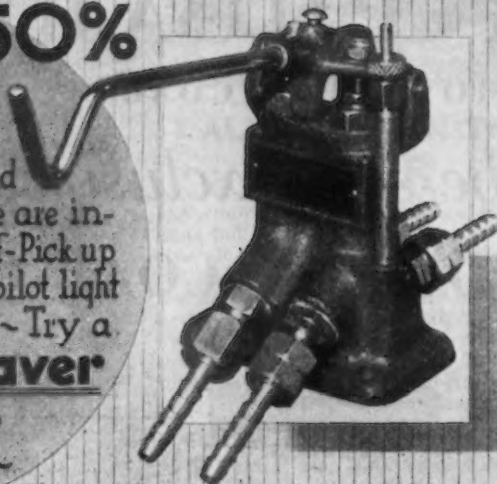
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Cincinnati, 811 Race St. · Cleveland, Midland Bldg. · Detroit, Buhl Bldg. · Chicago, La Salle-Wacker Bldg. · Norfolk, Nat. Bank of Commerce Bldg. · Baltimore, Fidelity Bldg. · Fairmont, Watson Bldg. · Philadelphia, Land Title Bldg. · Boston, 60 Congress St. · Portsmouth, 35 Pleasant St. · Washington, D. C. · Winston Salem, Reynolds Bldg. · Bluefield, Brad-Mann Bldg.

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641 BAGLEY AVE. DETROIT, MICHIGAN

Horace T. Potts Co., Philadelphia, has been appointed distributor of seamless stainless steel pipe in that territory by the Babcock & Wilcox Tube Co., New York, and will also continue to distribute B&W seamless boiler tubes.

Uddeholm Co. of America, Inc., New York, is opening its own warehouse in Chicago for the distribution of Uddeholm hot rolled tool steels and solid and hollow drill steels, at 1750-1752 West Carroll Avenue, and has appointed P. L. Getzinger as manager of sales.

Diamond Chain & Mfg. Co., Indianapolis, has appointed Hagerty Brothers, 923 South Washington Street, Peoria, Ill., as distributor for Diamond roller chain, sprockets, and flexible couplings.

Trade Publications

Steel Houses.—Structo, Inc., Kansas City, Mo. Attractive booklet entitled "The Modern Home," illustrating and describing Structo system of non-standardized prefabricated steel residences.

Piping Systems.—Tube-Turns, Inc., Louisville, Ky. Bulletin devoted to the design of modern industrial piping systems and illustrating method for determining the most economical pipe sizes and amount of frictional resistance in straight pipe and bends. Data cover flow of fuel and lubricating oils, water, brine, gasoline and other fluids.

Testing Screens.—Hendrick Mfg. Co., Carbondale, Pa. Booklet illustrating and describing its line of Weston testing screens; also folder entitled "Hendrick Products," including perforated metal grilles, elevator buckets, shaking chutes, "Mitco" open steel flooring, armorgrids and Shure-Site stair treads.

Machine Tools Aid 1934 Export Trade

WASHINGTON, April 5.—United States exports of machinery during 1934 amounted to \$98,348,000, a gain of nearly 78 per cent over the 1933 total of \$55,284,000, according to the Machinery Division Department of Commerce. The excellent gain was accomplished with no startling monthly increases, nor was it accompanied by unusually large shipments of any one item or exports to any particular country, as is often the case in the machinery trade. The growth during the year was steady, having recorded small increases since June, 1933, and, because of this fact, may be considered to be on a sound basis.

While statistics covering the trade by countries of destination

are not yet available, the accompanying table shows exports of the seven main groups of industrial machinery during the last four years.

During the year, the greatest strides were made in the power-driven metal working machinery, which is made up almost exclusively of machine tools. This recovery may be attributed mainly to the growth in technological progress throughout the world and the need for American high quality, high production machinery to accomplish this progress. Europe is, of course, the best market for this type of machinery and indicates that our best machinery customer is coming back to economic well-being.

Northeastern Ohio Foundrymen Organize

FOUNDRYMEN of northeastern Ohio held a meeting in Cleveland two weeks ago, formed an organization and voted to petition the American Foundrymen's Association for an affiliation as a chapter of that association to be known as the Northeastern Ohio chapter of the A. F. A.

The following officers were elected: Chairman, Walton L. Woody, National Malleable & Steel Casting Co.; vice-chairman, Frank G. Steinebach, *The Foundry*; secretary-treasurer, R. F. Lincoln, Osborn Mfg. Co., Cleveland. Directors: one year: R. W. Parsons, Ohio Brass Co., Mansfield; and Charles Seelbach, Forest City Foundries Co., and A. C. Denison, Fulton Foundry & Machine Co., Cleveland; two years: J. H. Bruce, Bowler Foundry Co., and William Gluntz, Gluntz Brass & Aluminum Co., Cleveland, and B. G. Parker, Youngstown Foundry & Machine Co., Youngstown; three years: Ralph H. West, West Steel Casting Co., R. E. Williams, Chicago Pneumatic Tool Co., and L. P. Robinson, Werner G. Smith Co., Cleveland.

EXPORTS OF INDUSTRIAL MACHINERY (VALUE IN THOUSANDS OF DOLLARS)

	1934	1933	1931	1929
Power generating machinery, except electric and automotive	6,598	3,845	12,671	29,091
Construction and conveying machinery ..	5,533	2,813	12,371	26,485
Mining, well and pumping machinery ..	24,201	13,504	25,256	54,449
Metal working machinery, power driven ..	19,434	8,158	36,027	33,439
Other metal working machinery	2,345	1,211—	4,003	7,365
Textile, sewing and shoe machinery	15,449	9,825	12,716	27,834
Other industrial machinery	24,788	15,926	39,106	89,157
Total	98,348	55,282	142,150	267,820



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466 DIFFERENT
RATIOS, TYPES, AND SIZES

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You will have no difficulty in selecting and ordering the right type of high grade speed reducer for your purpose from this wide variety.

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Direct Factory Branches in Boston, New York, Philadelphia, Cleveland and Chicago. Sales Offices in Utica, N. Y., Dayton, Ohio, Springfield, Mass., Greensboro, N. C., and Minneapolis, Minn.

Stocks and Service Stations from Coast to Coast

BOSTON GEARS

Oriental Mystic at Montreal Meeting

FOLLOWING the usual dinner and some motion pictures, members and guests of the Montreal Chapter, A.S.M., at its regular March meeting, learned something of oriental mysticism and of the metallurgical advances made in Mongolia during the period in which occidentals were chasing their dinners in the forests.

In the unfortunate absence of Dr. Hum Too Long, his disciple and assistant, Herr Prof. Dr. Ing. Von Huddlemuck, read his carefully prepared paper, which was illustrated with convincing slides and specimens. The paper dealt with the mining, ore dressing, metallurgy and application of Serenium, the mysterious element (periodic No. 0) responsible for the virtues of green sand. Incorporated in iron, steel and non-ferrous metals and alloys in suitable proportions and in a proper manner, this element confers truly marvelous properties. For example, such alloys are not subject to work-hardening, but have elastic limits equal to their ultimate strengths. This figure may reach 500,000 lb. per sq. in. in steel, combined with a ductility of 100 per cent elongation and (of course)

zero reduction of area. Further, the density of such steels may be as low as $2\frac{1}{2}$; it is confidently expected that the near future will see alloys capable of floating in a vacuum.

Several relevant questions were put to the lecturer, and were promptly answered to the entire satisfaction of the inquirer and the other members present. Other chapters desiring to book Dr. Hum Too Long may write to the International Nickel Co., New York.

New Individual Drives For Spinning Frames

ROCKWOOD MFG. CO., Chicago, announces three new Rockford drives for spinning frames. These three drives are produced in quantity and are simple to install.

Type No. 1 is designed to mount 8 in. above the floor; simple adjustments establish belt tensions. The weight of the motor is pivoted.

Type No. 2 is for shelf or bracket mounting. The pivoted motor base is recessed in a welded steel shelf.

Type No. 3 employs a vertical drive. Belt tension is maintained by springs beneath the motor shelf.

The drive is reversible without change or adjustment.

This equipment will be shown at the Greenville Textile Show in Greenville, N. C., April 8.

Mathews Conveyer Co. Celebrates 30th Year

MATHEWS CONVEYER CO., Ellwood City, Pa., is this month celebrating its 30th anniversary. The parent company, the Mathews Gravity Carrier Co., was established April 8, 1905. It grew out of a method for handling bundles of shingles on cast iron rollers or wheels which was originated by Rufus P. Mathews, who was then



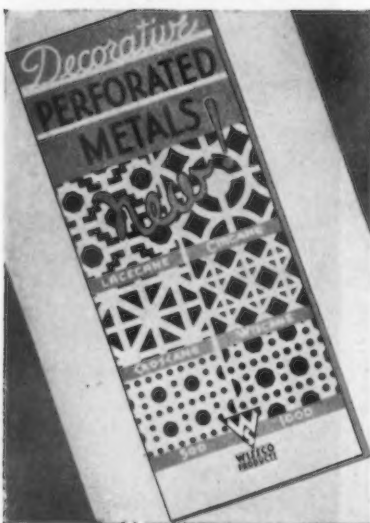
F. E. MOORE

vice-president of the Central Warehouse Co. of St. Paul.

Originating through the needs of the lumber industry, the roller conveyor idea rapidly spread to other uses in various industries and is today an essential part of steel and metal working transportation.

F. E. Moore, president of the company, joined the organization in 1905 and has been largely instrumental in the development of the company and its products since that time.

The value of nickel additions to steel in combating the destructive forces encountered in engineering structures, including fatigue, shock, wear, heat and corrosion, will be discussed by H. J. French, in charge of alloy steel and iron development, International Nickel Co., New York, at a meeting of the Milwaukee chapter of the American Society for Metals on April 11.



A NEW FOLDER on Decorative Perforated Metals

New uses of Decorative Perforated Metals demand more attractive period designs and increased free air space. Send for this folder and see the new Wissco Designs.

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd St., New York City

Please send me your New Folder featuring Decorative Perforated Metals.

Name
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Depend upon Truscon

FOR ALL *Light* **MEDIUM** **HEAVY** **PRESSED STEEL PARTS**

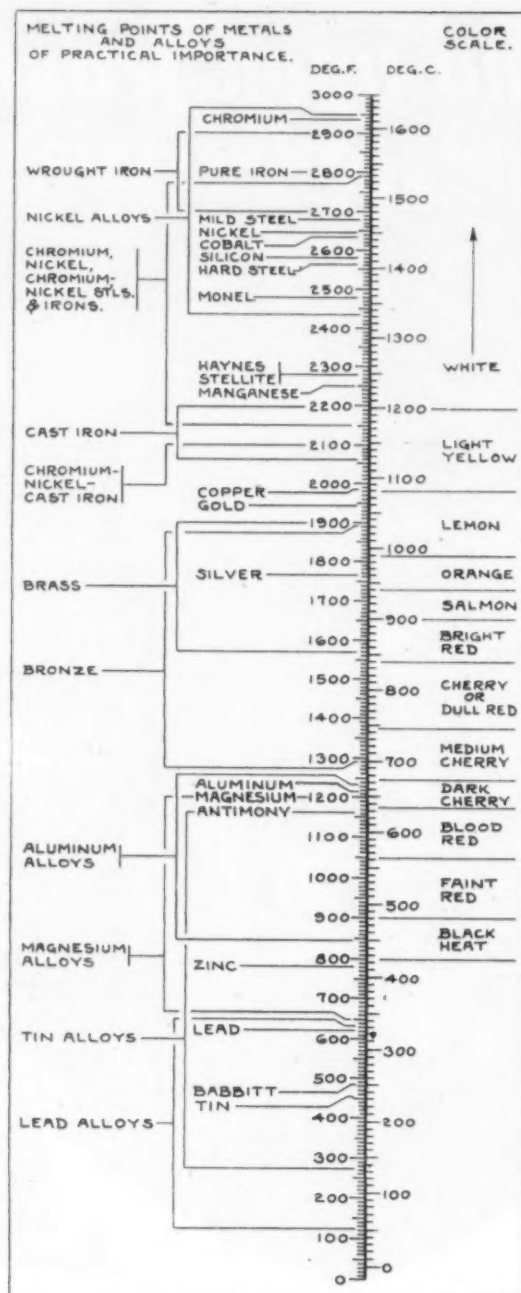
The Truscon Plant is complete in every detail for the manufacture of light, medium or heavy pressed steel parts. The combination of modern equipment and experienced technical skill makes economical production and timely delivery of pressed steel parts possible. Illustrated are a few examples of the wide scope of Truscon's stamping experience. Truscon also manufactures a complete line of material handling equipment. For more complete information send for our Pressed Steel Handbook.

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Fahrenheit-Centigrade Temperature Chart with Melting Points and Temperature Colors



THE Fahrenheit-Centigrade temperature chart in the adjoining column not only provides a ready means for converting temperatures from one scale to the other, but shows in convenient form the melting points of various metals and alloys and also the color designations commonly used in judging the temperature of hot metals by color. It is reproduced by courtesy of the Linde Air Products Co., New York.

Melting points are at the left of the scale and color designations at the right. The melting points

shown as single temperatures are for metals that are elements. Each group of alloys has a range of melting points due largely to the effect of even a small change in relative composition. The ranges shown are, however, indicative of the relationship in melting point between a metal and its alloys and between different groups of alloys. The temperature color chart can, of course, merely suggest the relationship between heat colors of metals and temperatures. For best results, observations should be made in the dark.

Builds Crane in 16 Working Days

THE Harnischfeger Corp., Milwaukee, recently built a 15-ton capacity, 100-ft. span, three-motor crane for the Inland Steel Co., Indiana Harbor, Ind., in a period of 16 working days, which is believed to be the shortest time in which a crane of its size and capacity has ever been completed. The crane is of all steel construction, with cast steel trolley frames. It has mill-type motors with full magnetic relay controls, composite type end-trucks and platforms both sides of the bridge. Its total weight is 168,000 lb. It was ordered for urgent delivery to handle production on a large tonnage contract involving a continuous strip mill.

Will Changes in Motive Power Revolutionize Railroads?

(CONCLUDED FROM PAGE 18)

ciencies and decrease the weight of electrical equipment the Diesel engine will remain under a handicap to which it is not entitled. While the possibilities are remote at this time, some substitute for the electric drive may be ultimately devised. That is a problem that should receive the consideration of those principally involved.

From the record of experience, therefore, it is apparent that any large installations of Diesel locomotives in the future are problematical, and that for some time to come the railroads will depend, for main line work, on steam locomotives, modernized and improved as the exigencies of the service demand. As an approximation of the distribution it would seem that at least 70 to 75 per cent of the motive power units purchased in the next few years will be steam, the balance to be divided between electric and Diesel electric.

The conclusion cannot be escaped that the Diesel-electric principle has not yet demonstrated its flexibility, or ability to furnish the horsepower demands of the railroads, whereas railroad men can command steam power in any unit from 100 hp. to upward of 7000 hp., with the full knowledge that it can be produced in commercial units capable of delivering the full power, at extremely low first cost, with unusual efficiency in operation, and absolute dependability over the economic life of the unit, which will be at least 20 years.